

Burr Saddle Project Environmental Assessment



**Missoula Unit
Southwestern Land Office
Montana Department of Natural Resources and Conservation
October, 2019**



Burr Saddle Project Environmental Assessment

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Burr Saddle Project

Environmental Assessment

Project Name: Burr Saddle Project
Proposed Implementation Date: October 2019
Proponent: Missoula Unit, Southwestern Land Office, Montana DNRC
County: Missoula
Duration: 2019-2029

Type and Purpose of Action

Description of Proposed Action:

The Missoula Unit of the Montana Department of Natural Resources and Conservation (DNRC) is proposing forest management activities on 5,172 acres known as the Burr Saddle Projects. The project area is located west of St. Regis, MT (refer to vicinity map Attachment **A-1** and project map **A-2**) and includes the following sections:

Beneficiary	Legal Description	Total Acres	Treated Acres
Common Schools	Sec 16 Sec 21 Sec E2SE4 29 Sec 34 Lots 1-4, 5-12 Sec 35 T18N R27W	2170	1189
Public Buildings	Sec 33 T18N N27W	325	181
MSU 2 nd Grant	Sec 20 Sec 22 W1/2 Sec 27 W1/2 Sec 28 W 1/2 Sec 29 E2NE4,W2 T18N R27W	1898	1573
MSU Morrill			
Eastern College-MSU/Western College-U of M	Sec 28 E1/2 Sec 32 Sec 34 NW1/4 T18N R27W	779	356
Montana Tech			
University of Montana			

School for the Deaf and Blind			
Pine Hills School			
Veterans Home			
Public Land Trust			
Acquired Land			
Total		5172	3299

The proposal includes commercial timber harvests that would produce approximately 18 million board feet (MMBF) of timber, pre-commercial thinning projects, scarification projects, tree planting, weed spraying and timber permit projects. The proposed treatments would emulate disturbances caused by natural wildfire events, bring stands closer to the desired future condition, remove overstory trees with high defect and improve overall health and vigor of the stands. Which would result in an overall reduction in stand density and would allow the residual stand to utilize additional sunlight, nutrients and water and thereby promote growth of timber. In addition to timber harvest, the following table outlines all proposed activities under this EA:

Action	Quantity
Proposed Harvest Activities	
Overstory Removal	1304
Selection	
Commercial Thin	
Seed Tree	
Sanitation Harvest	1995
Total Treatment Acres	3299 acres
Proposed Forest Improvement Treatment	
Pre-commercial Thinning	1000 acres
Slashing	2541 acres
Planting	2000 acres
Pile and Scarify	2000 acres
Proposed Road Activities-DNRC Ownership	
New road construction (temp/permanent)	13 miles
Road maintenance	28.5 miles
Temp Spur	7 miles

Objectives of the project include:

- Generate revenue for the Common Schools Trust, Public Buildings Trust, Eastern College-MSU/Western College-U of M Trust and MSU 2nd Grant Trust.
- Improve access and Best Management Practices(BMP) compliance with new road construction and road maintenance activities.
- Improve site performance by removing phenotypically inferior leave trees from past harvests to promote better stand genetics.
- Bring stands closer to desirable future conditions (DFC).
- Harvest areas that contain moderate to high amounts of insect activity, root rot and other diseases.
- Reduce stand density and fuel loads.
- Pre-commercially thin stands to reduce competition and improve vigor.

- Implement a noxious weed management plan.
- Promote seedling regeneration via scarification and planting projects.

The lands involved in this proposed project are held in trust by the State of Montana. (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners and the DNRC are required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for the beneficiary institutions (Section 77-1-202, MCA).

The DNRC would manage lands involved in this project in accordance with:

- The State Forest Land Management Plan (DNRC 1996),
- Administrative Rules for Forest Management (ARM 36.11.401 through 471),
- The Montana DNRC Forested State Trust Lands Habitat Conservation Plan (HCP) (DNRC 2010)
- All other applicable state and federal laws.

Project Development

SCOPING:

- DATE:
 - January 2016
- PUBLIC SCOPED:
 - The scoping notice was posted on the DNRC Website: <http://dnrc.mt.gov>
 - 86 individuals, organizations and agencies were scoped.
 - A notice was placed in the Missoulian newspaper in January of 2016.
 - Estimated harvest volumes and miles of new road construction increased from the original scoping notice. A project update was posted on the DNRC website in September of 2019 to reflect these changes. In addition, letters were sent to the parties that had responded during the initial scoping period in 2016.
- COMMENTS RECEIVED:
 - A call and email from Layne Hansen indicated concerns about truck traffic on the Mill Creek Road. He was also wondering if the DNRC could limit the number of trips a truck makes during the day or limit the hours of truck traffic.
 - DNRC Response: Bill Burdick (the original project leader) called Mr. Hansen and they discussed what the usual duration and intensity of a timber sale entails. Following the conversation Mr. Hansen was less concerned with the Action Alternative.
 - Roger Hearst manages land for Christa Just adjacent to the project area.
 - They did not foresee the proposal causing any conflict with their parcel.
 - Ladd Knotek, Montana Fish, Wildlife and Parks, (FWP) was concerned about harvesting in class one Streamside Management Zones (SMZ's).
 - There are no class one or class two SMZs in the project area. The Missoula Unit Service Forester confirmed no stream exists in the Mill Creek drainage.

- MT FWP is concerned about bald eagles, lady's slippers, flammulated owls, pileated woodpeckers and road placement.
 - Wildlife concerns were addressed in the wildlife analysis.
 - Lady's slippers were not observed during field reconnaissance. However, species of concern were analyzed in the vegetation section of this EA.
- The Mineral County Resource Coalition (MNRC)/Denley Loge had commented in favor of the management and were curious about changes to motorized use.
 - Bill Burdick attended a MNRC meeting and also sent a memo indicating that the motorized use designation(s) in the area would not change following implementation of the project.
- These issues and concerns were incorporated into project planning and design and will be implemented in associated contracts.

INTERDISCIPLINARY TEAM (IDT):

- Project Leader: Amy Helena
- Vegetation analysis: Bill Burdick
- Archeologist: Patrick Rennie
- Wildlife Biologist: Garrett Schairer
- Hydrologist & Soil Scientist: Andrea Stanley

OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED: (*Conservation Easements, Army Corps of Engineers, road use permits, etc.*)

- **United States Fish & Wildlife Service-** DNRC is managing the habitats of threatened and endangered species on this project by implementing the Montana DNRC Forested Trust Lands Habitat Conservation Plan (HCP) and the associated Incidental Take Permit that was issued by the United States Fish & Wildlife Service (USFWS) in February of 2012 under Section 10 of the Endangered Species Act. The HCP identifies specific conservation strategies for managing the habitats of grizzly bear, Canada lynx, and three fish species: bull trout, westslope cutthroat trout, and Columbia redband trout. This project complies with the HCP. The HCP can be found at www.dnrc.mt.gov/HCP
- **Montana Department of Environmental Quality (DEQ)-** DNRC is classified as a major open burner by DEQ and is issued a permit from DEQ to conduct burning activities on state lands managed by DNRC. As a major open-burning permit holder, DNRC agrees to comply with the limitations and conditions of the permit.

A Short-term Exemption from Montana's Surface Water Quality Standards (318 Authorization) may also be required from DEQ if activities such as replacing a bridge on a stream would introduce sediment above natural levels into streams.

- **Montana/Idaho Airshed Group-** The DNRC is a member of the Montana/Idaho Airshed Group which was formed to minimize or prevent smoke impacts while using fire to accomplish land management objectives and/or fuel hazard reduction (Montana/Idaho Airshed Group 2006). The Group determines the delineation of airsheds and impact zones throughout Idaho and Montana. Airsheds describe those geographical areas that have similar atmospheric conditions, while impact zones describe any area in Montana or Idaho that the Group deems smoke sensitive and/or having an existing air quality problem (Montana/Idaho Airshed Group 2006). As a member of the Airshed Group,

DNRC agrees to burn only on days approved for good smoke dispersion as determined by the Smoke Management Unit.

- **United State Forest Service (USFS)** - DNRC and USFS have a Cost Share agreement on portions of the haul route.

ALTERNATIVES CONSIDERED:

No-Action: Under the No-Action Alternative the following stand conditions would persist:

- Root rot would continue to cause mortality across all age classes of Douglas-Fir.
- In areas without root rot, shade tolerant species would continue to out compete seral species.
- No planting would take place to convert root rot infected stands to more resistant species.
- Increased fuel loading both on the ground and as ladder fuels would increase the likelihood of a crown fire and mortality across all age classes.
- No revenue would be generated for the associated trusts in the project area.
- No pre-commercial thinning would occur at this time and shade tolerant species would continue to overcrowd the seral species that historically occupied the area.

Action Alternative:

- DNRC would harvest approximately 18 MMBF from approximately 3,299 acres. This would consist of several timber sales and/or timber permits. The first being the Burr Saddle Project. Slash would be piled and burned postharvest.
- Planting and pre-commercial thinning activities would take place postharvest to improve growth and vigor in the stands.
- Scarification would occur during harvest activities or post harvest to improve site quality for natural seedling regeneration.
- New road construction and road maintenance activities would take place to improve access and bring existing roads up to BMP standards.
- Weed spraying would be conducted following harvest activities.
- Motorized access in the project area would not change post harvest.

Impacts on the Physical Environment

VEGETATION:

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to vegetation:

- Timber harvesting and road building may introduce and spread noxious weeds in the project area.
- Root rot may continue to cause mortality in the overstory
- Shade tolerant species would continue to out compete seral species-removing stands from their historic cover type and species distribution.
- Young stands are currently overstocked with natural regeneration
- There is concern that the proposed projects could negatively impact populations of threatened, endangered, or sensitive plant species.
- Forest Management activities may adversely affect Old Growth

Recommended Mitigation Measures for Vegetation- The analysis and levels of effects to vegetation resources are based on implementation of the following mitigation measures.

- Wash equipment prior to harvest operations to limit noxious weed spread.
- Plant grass seed on new roads to expedite grass establishment and limit weed potential.
- Favor western larch and ponderosa pine to limit effects of root rot in the project area.
- Plant western larch and ponderosa pine in root rot infected areas to convert stands to a resistant species.
- Prescribe an overstory removal/sanitation harvest in order to emulate natural disturbance historically present on the landscape.
- If sensitive plant species are identified during harvest operations avoid disturbance to the individual plants whenever possible.

Recommended Mitigations and Adjustments of Harvest Treatments for the Benefit of Other Resources

- Snags, snag recruits, and coarse woody debris will be managed according to *ARM* 36.11.411 through 36.11.414, particularly favoring western larch. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.
- Retention of patches of advanced regeneration of shade-tolerant trees, such as sub-alpine-fir and spruce, in units containing lynx habitats would break-up sight distances, provide

horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx.

- In pre-commercial thinning units, retain small shade tolerant trees (such as sub-alpine fire and spruce to provide potential habitat structure for snowshoe hares by increasing the levels of horizontal cover and accelerating the development of multi-storied stands.
- Provide connectivity for fisher, Canada lynx, and a host of other species by maintaining corridors of unharvested and/or lighter harvested areas along riparian areas, ridge tops, and saddles. Design a heavier retention corridor through the Mill Creek drainage that is at least 300 feet wide with 40% or more canopy closure following treatments that could facilitate movements and provide some landscape connectivity.

FOR COMPLETE VEGETATION ANALYSIS SEE ATTACHMENT B

SOILS:

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to soils:

- Soil resources may be adversely affected by implementation of the project. Issues include the following:
 - slope stability
 - erosion
 - physical disturbance (compaction and displacement)
 - nutrient cycling and soil productivity

No soil resource related comments were received during scoping. Evaluating for the above will address issues known to be associated with activities similar to the proposed project. These issues listed above are discussed in greater detail below:

Recommended Mitigation Measures for Soils- The analysis and levels of effects to soils resources are based on implementation of the following mitigation measures.

- To prevent soil compaction ground-based mechanical felling and yarding would be restricted to one or more of the following conditions:
 - Soil moisture content at 4-inch depth less than 20% oven-dry weight.
 - Minimum frost depth of 4 inches.
 - Minimum snow depth of 18 inches of loose snow or 12 inches packed snow.
- For each individual sale the logger and the Forest Officer would agree to a general hauling, landing, and skidding plan prior to equipment operations to meet the following objectives:
 - Limit trails to existing skid trail disturbances as much as possible to minimize new disturbances.
 - Limit ground-based equipment operations on slopes greater than 45%, except for short pitches.

- Slash would be distributed within harvest units, including large (≥ 3 -inch diameter) and fine material (such as branches and leafy material), to maintain or achieve the amount of coarse woody material appropriate to the dominant habitat type within the project area:
 - Douglas-fir/ninebark (DF/PHMA) is **4.5 to 9 tons per acre** (Graham et al., 1994)
 - Grand fir/beargrass (GF/XETE) is **7 to 14 tons per acre** (Graham et al., 1994)
- Skid trails and landings would be treated with slash, water bars, and grass seed to reduce the risk of water concentration and impede overland flow and consequent erosion, to reduce soil detachment by raindrop impact, discourage the recruitment and establishment of weeds on disturbed soils.
- Roads and trails resulting from unauthorized motorized travel (unauthorized ATV trails) within the project area would be reclaimed and obstructed from further motorized use as equipment access allows. This work would occur as harvest and road work progresses to areas adjacent to unauthorized ATV trails. The work could include the following or other possible methods as deemed feasible and effective by the Forest Officer and equipment operator: Kelly humps, fencing, signs, scarification, and heavy slashing. Routine inspection and photo monitoring and coordination with local and agency law enforcement may also be employed to discourage and enforce State Trust Land Access rules and laws. This would reduce the risk of the expansion of the existing unauthorized ATV trail network following vegetation removal associated with the proposed project.
- Scarification by dispersed skidding would be limited to the following conditions:
 - Slopes less than 45%
 - Cumulative area of direct disturbance, when combined with ground-based yarding disturbances, would not exceed 40%.
 - Where there is an identified need for mineral soil exposure for germination of desired species (such as western larch).
 - Scarification depths not to exceed those necessary to achieve exposure of mineral soil and not more necessary.

FOR COMPLETE SOILS ANALYSIS SEE ATTACHMENT C.

WATER RESOURCES:

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to water resources:

- Timber harvest, site preparation, road construction/maintenance, and vegetation management can alter local water quality and quantity. Water resource issues include the following:
 - Quality
 - Quantity

Recommended Mitigation Measures for Water Resources- The analysis and levels of effects to water resources are based on implementation of the following mitigation measures.

- Drainage improvement and maintenance work would be completed on existing roads within state lands and on the haul route between the project area and the nearest county road. The Project Manager would complete a road log for location and design of drainage improvements on existing roads and for the installation of the proposed new roads.
- Ephemeral draw bottoms would be monitored during harvest operations to watch for a changing condition that would constitute the presence of a stream meeting the definitions within MCA 77-5-302(7). If a stream is observed, all harvest and equipment operations would be adjusted to comply with SMZ, HCP, ARM, and SFLMP requirements. This applies especially to the mapped alignments of Mill and Fourmile Creeks shown in Figure W-1.
- The Forest Officer, DNRC Hydrologist, and other DNRC staff would work to apply resources strategically and coordinate with local law enforcement to eliminate or reduce the unauthorized motorized access to DNRC trust lands occurring in the area. Actions would include repairing fencing, obstructing and potentially obliterating existing unauthorized roads and trails, signs, and monitoring. These actions may be limited based on availability of staff and funding resources. This work may also be phased as commercial harvest and route work progresses through the project area. **Priority obliteration and drainage improvement work would be focused on areas where unauthorized trails intersect open road infrastructure and where they intersect ephemeral draws.**

FOR COMPLETE WATER RESOURCES ANALYSIS SEE ATTACHMENT D.

FISHERIES RESOURCES *(including unique, federally listed as threatened or endangered, sensitive, and/or species of special concern):*

After the consideration of project-specific issue statements and the extent of the proposed actions, potential effects to fisheries resources in the Mill Creek and Fourmile watershed are dismissed from further assessment due to the absence of fishbearing streams in the project area. No foreseeable direct or indirect impacts to fisheries resources would be expected to occur in the watershed, and no additional cumulative effects to fisheries resources would be expected in the watershed as a result of implementing the Action Alternative.

WILDLIFE *(terrestrial & avian including unique, federally listed as threatened or endangered, sensitive, and/or species of special concern):*

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to wildlife:

- Proposed activities could alter mature forested habitats and/or landscape connectivity, which could affect species that rely on these mature forested habitats, and/or alter connectivity and the ability of wildlife requiring corridors to move through the landscape.
- Proposed activities could alter cover, reduce secure areas, and increase access, which could affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.
- Proposed activities could negatively affect Canada lynx by altering lynx winter foraging habitat, summer foraging habitat, and other suitable habitat, rendering these habitats unsuitable for supporting lynx.
- Proposed activities could negatively affect bald eagles by reducing nesting and perching structures and/or disturbing nesting bald eagles
- Proposed activities could reduce the amount and/or quality of fisher habitats, which could alter fisher use of the area.
- Proposed activities may alter flammulated owl habitat by reducing canopy closure and increasing tree spacing, while potentially removing snags needed by flammulated owls for nesting.
- Proposed activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.
- Proposed activities could reduce suitable nesting and foraging habitat for pileated woodpeckers, which could alter pileated woodpecker use of the area.
- Proposed activities could remove forest cover on big game winter range, which could reduce the carrying capacity of the winter range
- Proposed activities could remove big game security cover, which could affect hunter opportunity and local quality of recreational hunting.

Recommended Mitigation Measures for Wildlife- The analysis and levels of effects to wildlife are based on implementation of the following mitigation measures.

- A DNRC biologist would be consulted if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.435) are needed.
- Motorized public access would be restricted at all times on restricted roads that are opened for harvesting activities; signs would be used during active periods and a physical closure (gate, barriers, equipment, etc.) would be used during inactive periods (nights, weekends, etc.). These roads and skid trails would be reclosed to reduce the potential for unauthorized motor vehicle use.

- Snags, snag recruits, and coarse woody debris would be managed according to *ARM* 36.11.411 through 36.11.414, particularly favoring western larch and ponderosa pine. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.
- Contractors and purchasers conducting contract operations would be prohibited from carrying firearms while on duty.
- Food, garbage, and other attractants would be stored in a bear-resistant manner.
- Retention of patches of advanced regeneration of shade-tolerant trees, such as sub-alpine-fir and spruce, in units containing lynx habitats would break-up sight distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx.
- In pre-commercial thinning units, retain small shade tolerant trees (such as sub-alpine fir and spruce to provide potential habitat structure for snowshoe hares by increasing the levels of horizontal cover and accelerating the development of multi-storied stands.
- Provide connectivity for fisher, Canada lynx, and a host of other species by maintaining corridors of unharvested and/or lighter harvested areas along riparian areas, ridge tops, and saddles. Design a heavier retention corridor through the Mill Creek drainage that is at least 300 feet wide with 40% or more canopy closure following treatments that could facilitate movements and provide some landscape connectivity.

FOR COMPLETE WILDLIFE ANALYSIS SEE ATTACHMENT E.

AESTHETICS

Any changes to the scenery in the area could be observed from certain points along Highway 135, the I-90 corridor and in the local town of St Regis. This analysis includes all known past and present effects.

Existing Conditions

Portions of the project area can be accessed from open roads in the Mill Creek and Fourmile Creek drainages. The majority of the project area exists behind gates with motorized travel restrictions which only allow snowmobile traffic.

The project area is surrounded by Forest Service land and small private landowners. Past forest management in adjacent lands and within portions of the project area have resulted in a forest of well vegetated young stands of trees 5-30 feet tall across the landscape intermixed with mature mixed conifer forests.

-VISUAL QUALITY

No Action Alternative:

No harvesting, thinning or planting would take place. Naturally occurring forest processes including insects and disease, fire and shade tolerant species ingrowth would continue.

Action Alternative:***Direct, Secondary, and Cumulative Effects***

Under the Action Alternative, approximately 40-60% of the overstory trees within the harvest units would be removed utilizing ground based and cable yarding harvest systems. The proposed prescriptions would remove trees containing insects, disease, shade tolerant tree species, suppressed trees across all size classes, as well as emulate natural disturbances (such as historically occurring wildfire). Trees previously killed by bark beetles that no longer contain beetles, beetle larvae or commercial value would be left unless they have to be removed in order to safely harvest the area. These trees would eventually fall over creating microsites which would be utilized during tree planting activities to capture shade for seedlings. This prescription would result in a post-harvest stand appearance resembling natural disturbance, with scattered clumps as well as unevenly spaced overstory trees remaining throughout the project area. In areas being treated by cable yarding systems, yarding corridors would be kept narrow to limit visual impacts. Slash piles consisting of tree limbs, tops and other vegetative debris would be created throughout the project area during harvesting. These slash piles would ultimately be burned after harvesting operations have been completed.

The proposed Action Alternative would be expected to have moderate direct, indirect, or cumulative effect based on the following:

- The project area can be observed from different points along a state highway, interstate and the town of St Regis.
- The proposed treatments would reduce stocking by up to 60% in some areas.

Aesthetics Mitigations:

- In areas where natural regeneration does not occur, tree seedlings would be planted to encourage regeneration and limit long term visual impacts
- In areas being treated by cable yarding systems, yarding corridors would be kept narrow to limit visual impacts.

HISTORICAL AND ARCHEOLOGICAL SITES:

A Class I (literature review) level review was conducted by the DNRC staff archaeologist for the area of potential effect (APE). This entailed inspection of project maps, DNRC's sites/site leads database, land use records, General Land Office Survey Plats, and control cards. The Class I search revealed that no cultural or paleontological resources have been identified in the APE. Because the APE on state land has been subjected to previous logging, because the Holocene age soils in the APE are relatively thin, and because the local geology is not likely to produce caves, rock shelters, or sources of tool stone, no additional archaeological investigative work will be conducted in response to this proposed development. However, if previously unknown cultural or paleontological materials are identified during project related activities, all work will cease until a professional assessment of such resources can be made.

No Action Alternative:

The No Action Alternative would not have any direct, indirect, or cumulative effects to these sites.

Action Alternative:

Under the proposed Action Alternative, if any historical or archaeological sites are discovered during the course of the project, they would be protected and a DNRC archaeologist would be notified immediately.

Therefore, the proposed Action Alternative would not be expected to have any direct, indirect, or cumulative effect on historical or archaeological resources.

DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR, AND ENERGY:

There would be no measurable direct, secondary, and cumulative impacts related to environmental resources of land, water, air, and energy due to the relatively small size of the timber sale project.

OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:

- Fisheries Biological Assessment & Evaluation, United States Forest Service, Lolo National Forest, Region 1, Montana. September, 2014, assess effects of DNRC Cost share Easement in the Placid Lake area.
- State Forest Land Management Plan EIS, DNRC 1996, set the strategy that guides DNRC management decisions statewide.
- USFWS and DNRC. 2010. Montana Department of Natural Resources and Conservation Forested Trust Lands Habitat Conservation Plan, Final Environmental Impact Statement, Volumes I and II. U.S. Department of Interior, Fish and Wildlife Service, Region 6, Denver, Colorado, and Montana Department of Natural Resources and Conservation, Missoula, MT. September 2010.

Impacts on the Human Population

HUMAN HEALTH AND SAFETY:**Air Quality**

The DNRC is a member of the Montana/Idaho Airshed Group which was formed to minimize or prevent smoke impacts while using fire to accomplish land management objectives and/or fuel hazard reduction (Montana/Idaho Airshed Group 2006). The Group determines the delineation of airsheds and impact zones throughout Idaho and Montana. Airsheds describe those geographical areas that have similar atmospheric conditions, while impact zones describe any area in Montana or Idaho that the Group deems smoke sensitive and/or having an existing air quality problem (Montana/Idaho Airshed Group 2006).

The project area is located within Montana Airshed 2, which encompasses Mineral County. Currently, this Airshed does not contain impact zones.

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to air quality:

- Smoke would be produced during pile burning.
- Dust would be produced during harvesting and hauling activities.

-SLASH BURNING

No Action Alternative:

No slash would be burned within the project areas. Thus, there would be no effects to air quality as a result of the proposed activities within the local vicinity and throughout Airshed 2.

Action Alternative:

Direct and Secondary Effects

Slash consisting of tree limbs and tops and other vegetative debris would be piled throughout the project area during harvesting and pre-commercial thinning. Slash would ultimately be burned after harvesting operations have been completed. Burning would introduce particulate matter into the local airshed, temporarily affecting local air quality. Over 70% of emissions emitted from prescribed burning are less than 2.5 microns (National Ambient Air Quality PM 2.5). High, short-term levels of PM 2.5 may be hazardous. Within the typical column of biomass burning, the chemical toxics are: Formaldehyde, Acrolein, Acetaldehyde, 1,4 Butadiene, and Polycyclic Organic Matter.

Burning within the project area would be short in duration and would be conducted when conditions favor good to excellent ventilation and smoke dispersion as determined by the Montana Department of Environmental Quality and the Montana/Idaho Airshed Group. The DNRC, as a member of the Montana/Idaho Airshed Group, would burn only on approved days.

Thus, direct and secondary effects to air quality due to slash burning associated with the proposed action would be minimal.

Cumulative Effects

Cumulative effects to air quality would not exceed the levels defined by the State of Montana Cooperative Smoke Management Plan (1988) and managed by the Montana/Idaho Airshed Group. Prescribed burning by other nearby airshed cooperators (for example the U.S. Forest Service) would have potential to affect air quality. All cooperators currently operate under the same Airshed Group guidelines. The State, as a member, would burn only on approved days. This should decrease the likelihood of additive cumulative effects. Thus, cumulative effects to air quality due to slash burning associated with the proposed action would also be expected to be minimal.

-DUST

No Action Alternative:

No increased dust would be produced as a result of the proposed timber sale. Current levels of dust would be produced in the area.

Action Alternative:***Direct, Secondary, and Cumulative Effects***

Harvesting operations would be short in duration. Dust may be created from log hauling on portions of native surface roads during summer and fall months.

Contract clauses would provide for the use of dust abatement or require trucks to reduce speed if necessary to reduce dust near any affected residences.

Direct, secondary, and cumulative effects to air quality due to harvesting and hauling associated with the proposed action would be minimal.

Recommended Mitigation Measures for Air Quality- The analysis and levels of effects to air quality are based on implementation of the following mitigation measures:

- Only burn on days approved by the Montana/Idaho Airshed group and DEQ.
- Conduct test burn to verify good dispersal.
- Dust abatement may be used as necessary.
- Slower speed limits on DNRC controlled roads may be included in contracts as necessary to reduce dust.

RECREATION (including access to and quality of recreational and wilderness activities):

The area is used for hiking, hunting, cross-country skiing, snowmobiling and general recreating. Currently, roads through the area are closed to motorized use and used only for administrative purposes. There would be no change in road closure status and the selection of either alternative would not affect the ability of people to recreate on this parcel.

There will be no change from existing conditions. Therefore, there would be no measurable direct, secondary, or cumulative impacts on recreation from this proposed action.

Will the No-Action or Action Alternatives result in potential impacts to:	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
No-Action														
Health and Human Safety	X				X				X					
Industrial, Commercial, and Agricultural Activities and Production	X				X				X					
Quantity and Distribution of Employment	X				X				X					
Local Tax Base and Tax Revenues	X				X				X					
Demand for Government Services	X				X				X					
Density and Distribution of Population and Housing	X				X				X					
Social Structures and Mores	X				X				X					

Will the No-Action or Action Alternatives result in potential impacts to:	Impact												Can Impact Be Mitigated?	Comment Number	
	Direct				Secondary				Cumulative						
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High			
Cultural Uniqueness and Diversity	X				X				X						
Action															
Health and Human Safety		X				X				X				yes	1
Industrial, Commercial, and Agricultural Activities and Production	X				X				X						
Quantity and Distribution of Employment		X				X				X				yes	2
Local Tax Base and Tax Revenues	X				X				X						
Demand for Government Services	X				X				X						
Density and Distribution of Population and Housing	X				X				X						
Social Structures and Mores	X				X				X						
Cultural Uniqueness and Diversity	X				X				X						

Comment Number 1:**Impact**

Log truck traffic in the area would increase for the duration of the timber sale, which could cause a low impact to human safety.

Mitigations:

- Signs would be posted indicating that log truck traffic is present in the area.
- If necessary, a slower speed limit on DNRC controlled roads may also be imposed in the timber harvest contract.
- Log hauling will take place typically during the general “work week”.

Comment Number 2:**Impact**

According to the Montana Bureau of Business and Economic Research a general rule of thumb is that for every million board feet of sawtimber harvested in Montana ten person years of employment occur in the forest products industry.

This harvest is viewed as a continuation of a sustained yield and as such would not create any new jobs but rather sustain approximately 45 person years of employment in the forest products industry. A few short-term jobs would also be created/sustained by issuing pre-commercial thinning contracts following harvest. Additionally, local businesses, such as hotels, grocery stores, and gas stations would likely receive additional revenues from personnel working on the proposed project. This would be a positive low impact to quantity and distribution in the area.

Mitigations:

This impact would be positive and mitigations would not be necessary.

LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS *(includes local MOUs, management plans, conservation easements, etc):*

None

OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

The proposed action has a projected harvest volume of 18 MMBF. This volume is worth approximately \$420/MBF delivered to a forest products manufacture site at current market prices. Delivered to market, the proposed action has a total revenue value of an estimated \$7,560,000. Removing the timber sale purchaser's contracted operations and DNRC's development, administration, and operation expenses, the trust beneficiaries net between an estimated 15 and 35 percent of total delivered sawlog market value. Therefore, the proposed action may generate net income for trust beneficiaries between \$6,426,000 and \$4,914,000. Costs related to the administration of the timber sale program are only tracked at the Land Office and Statewide level. DNRC does not track project-level costs for individual timber sales. An annual cash flow analysis is conducted on the DNRC forest product sales program. Revenue and costs are calculated by land office and statewide. These revenue-to-cost ratios are a measure of economic efficiency. A recent revenue-to-cost ratio of the Southwestern Land Office was 1:1.82. This means that, on average, for every \$1.00 spent in costs, \$1.82 in revenue was generated. Costs, revenues, and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return.

In addition to stumpage revenue. Forest Improvement fees would be collected for sawlog material during timber harvest. Current Forest Improvement fees at the Southwestern Land Office are \$10.40/MBF. Given the projected volume estimates, the Action Alternative would generate approximately \$187,200 for the Forest Improvement fund.

According to the Bureau of Business and Economic Research (Hayes et al, 2017), Mills in Montana need 437 MMBF per year to maintain current production levels (approximately 62% capacity) and industry infrastructure. Currently the Sustained Yield and target harvest from Trust Lands is 56.9 MMBF, which represents approximately 13 % of timber harvested in the state of Montana. This project would provide approximately 18 MMBF of timber towards the Sustained Yield target thus helping sustain current mill capacity.

References

Hayes, Steven W.; Morgan, Todd A.; 2017. The Forest Products Industry in Montana, Part 2: Industry Sectors, Capacity and Outputs. Forest Industry Brief No. 4. Missoula, MT: University of Montana, Bureau of Business and Economic Research

Environmental Assessment Checklist Prepared By:**Name: Amy Helena****Title: Missoula Unit Forest Management Supervisor****Date: 09/10/2019**

Finding

Alternative Selected

An interdisciplinary team (ID Team) has completed the Environmental Assessment (EA) for the proposed Burr Saddle Project prepared by the Montana Department of Natural Resources and Conservation (DNRC). Two alternatives were developed and the effects of each alternative were fully analyzed in the EA. After a review of the EA, project file, public correspondence, Department Administrative Rules, policies, and the State Forest Land Management Plan (SFLMP), I have made the following decisions:

Alternative A (No Action) does not include the harvest of any timber. Alternative B (Action Alternative) proposes to harvest approximately 18,000,000 board feet of timber on 3,299 acres. Subsequent review determined that the alternatives, as presented, constituted a reasonable range of potential activities.

Significance of Potential Impacts

For the following reasons, I have selected the Action Alternative without additional modifications:

The Action Alternative meets the Project Need and the specific project objectives as described on page 4 of the EA. The Action Alternative would produce revenue to the trust beneficiaries, while providing a mechanism whereby the existing timber stands would be moved towards conditions more like those that existed historically.

The analysis of identified issues did not disclose any reason compelling the DNRC to not implement the timber sales.

The Action Alternative includes mitigation activities to address environmental concerns identified during both the Public Scoping phase and the project analysis.

Significance of Potential Impacts

For the following reasons, I find that the implementation of the Action Alternative would not have significant impacts on the human environment:

Soils-Leaving 4.5-14 tons of large, woody debris on site (depending upon Habitat Type) would provide for long-term soil productivity. Harvest mitigation measures such as skid trail planning and season of use limitations would limit the potential for severe soil impacts.

Water Quality-The Action Alternative would improve the surface drainage on existing roads, thereby reducing the amount of current sedimentation within the project area. Newly constructed roads would be located on mid to upper slopes away from surface waters, limiting affects to water quality. Water Quality Best Management Practices for Montana Forests (BMPs) and the Streamside Management Zone (SMZ) law would be strictly adhered to during all operations involved with the implementation of the Action Alternative.

Cumulative Watershed Effects-Estimated increases in annual water yield for the proposed action have been determined to be negligible by the DNRC Hydrologist. Increases in sediment yield are expected to be negligible due to the amount of area treated, location along the landscape, replacement and/or improvement of existing culverts and mitigations designed to minimize erosion.

Cold Water Fisheries- Due to planning and associated mitigation, it is unlikely that the proposed timber sale would affect large woody debris recruitment, shade or in-stream temperature in any fish-bearing streams within the project area.

Air Quality-Any slash burning conducted as part of the Burr Saddle Project would be conducted in coordination with the Montana/Idaho Airshed group in order to ensure that ideal smoke dispersion conditions exist prior to ignition and throughout the duration of any burning operations. As a result, impacts to air quality should be minor and short in duration.

Noxious Weeds-Equipment would be cleaned prior to entering the project area, which would reduce the likelihood of weed seeds being introduced onto treated areas. The DNRC would monitor the project area for two years after harvest and would use an Integrated Weed Management strategy to control weed infestations should they occur.

Forest Conditions and Forest Health-The proposed harvest would begin the process of returning the timber stands within the project area to those conditions that most likely existed on the site(s) prior to organized fire suppression.

Log Truck Use of Public Roads-Implementation of the recommended mitigations-i.e. strict adherence to posted speed limits, dust control if necessary and restrictions on the use of compression brakes should minimize the opportunity for conflicts between log trucks, other traffic and/or residences within the project area.

Wildlife-The proposed harvest operations present a minimal likelihood of negative impacts to Threatened and Endangered Species. Those potential impacts that do exist have been mitigated to levels within acceptable thresholds. The same is true for those species that have been identified as “sensitive” by the DNRC. The effects of the proposed action on Big Game species would be low to moderate.

Economics- The Action Alternative would produce an estimated net return between \$4,914,000 and \$6,426,000 (\$420/MBF) to the trust beneficiaries (42% Common Schools, 6% Public Buildings, 37% MSU 2nd Grant, 15% Eastern College-MSU/Western College-U of M) and does not limit the DNRC’s options for generating revenue from these sites in the future.

PRECEDENT SETTING AND CUMULATIVE IMPACTS-

The project area is located on State-owned lands, which are “principally valuable for the timber that is on them or for growing timber or for watershed” (**MCA 77-1-402**). The proposed action is similar to past projects that have occurred in the area. Since the EA does not identify future actions that are new or unusual, the proposed timber harvest is not setting precedence for a future action with significant impacts.

Taken individually and cumulatively, the identified impacts of the proposed timber sale are within established threshold limits. Proposed timber sale activities are common practices and none of the project activities are being conducted on fragile or unique sites. The proposed timber sale conforms to the management philosophy adopted by DNRC in the SFLMP and is in compliance with existing laws, Administrative Rules, and standards applicable to this type of action.

SHOULD DNRC PREPARE AN ENVIRONMENTAL IMPACT STATEMENT (EIS)?

Based on the following, I find that an EIS does not need to be prepared:

- The EA adequately addressed the issues identified during project development, and displayed the information needed to make the pertinent decisions.
- Evaluation of the potential impacts of the proposed timber sale indicates that significant impacts to the human environment would not occur as a result of the implementation of the Action Alternative.
- The ID Team provided sufficient opportunities for public review and comment during project development and analysis.

Need for Further Environmental Analysis☐

EIS

☐

More Detailed EA

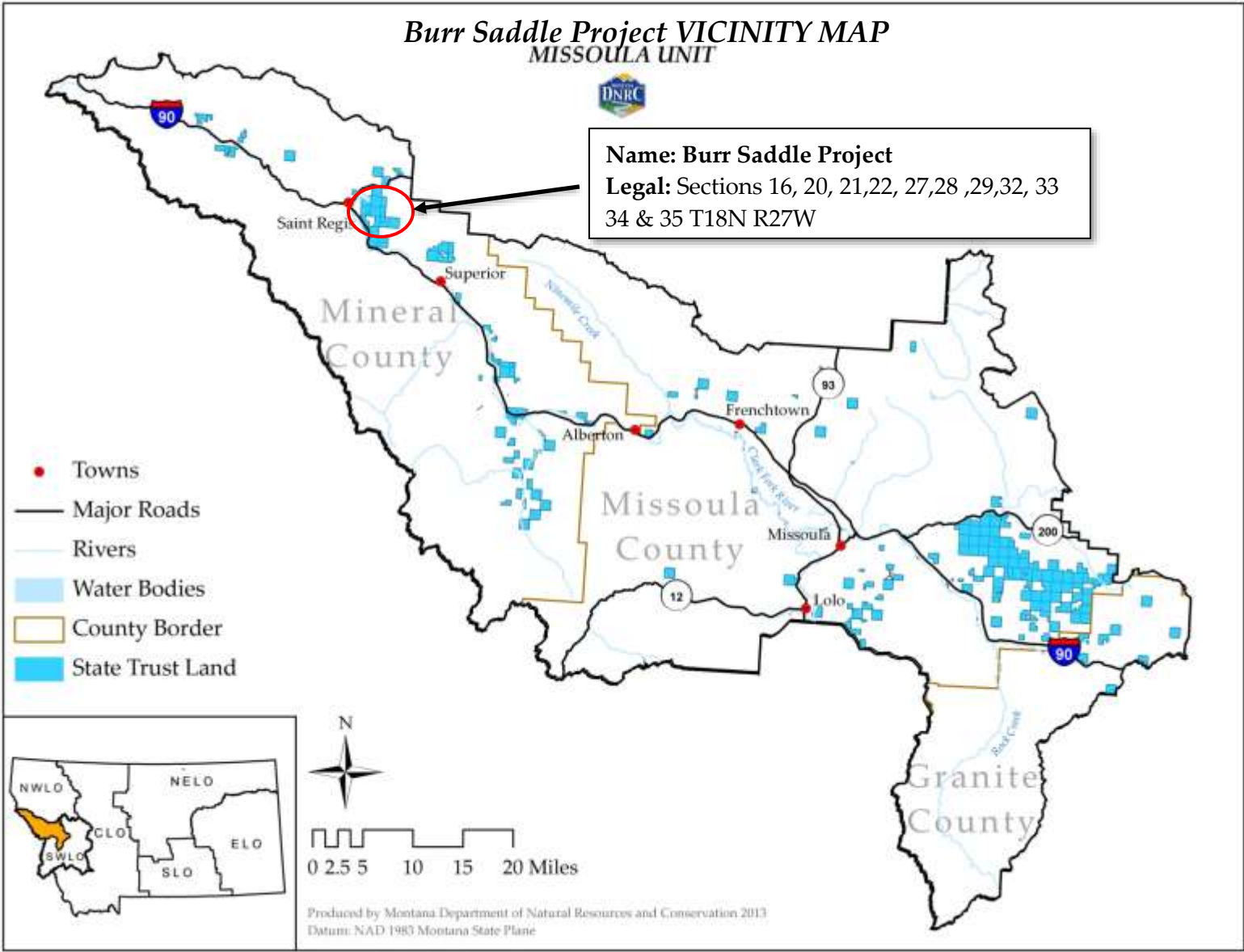
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No Further Analysis

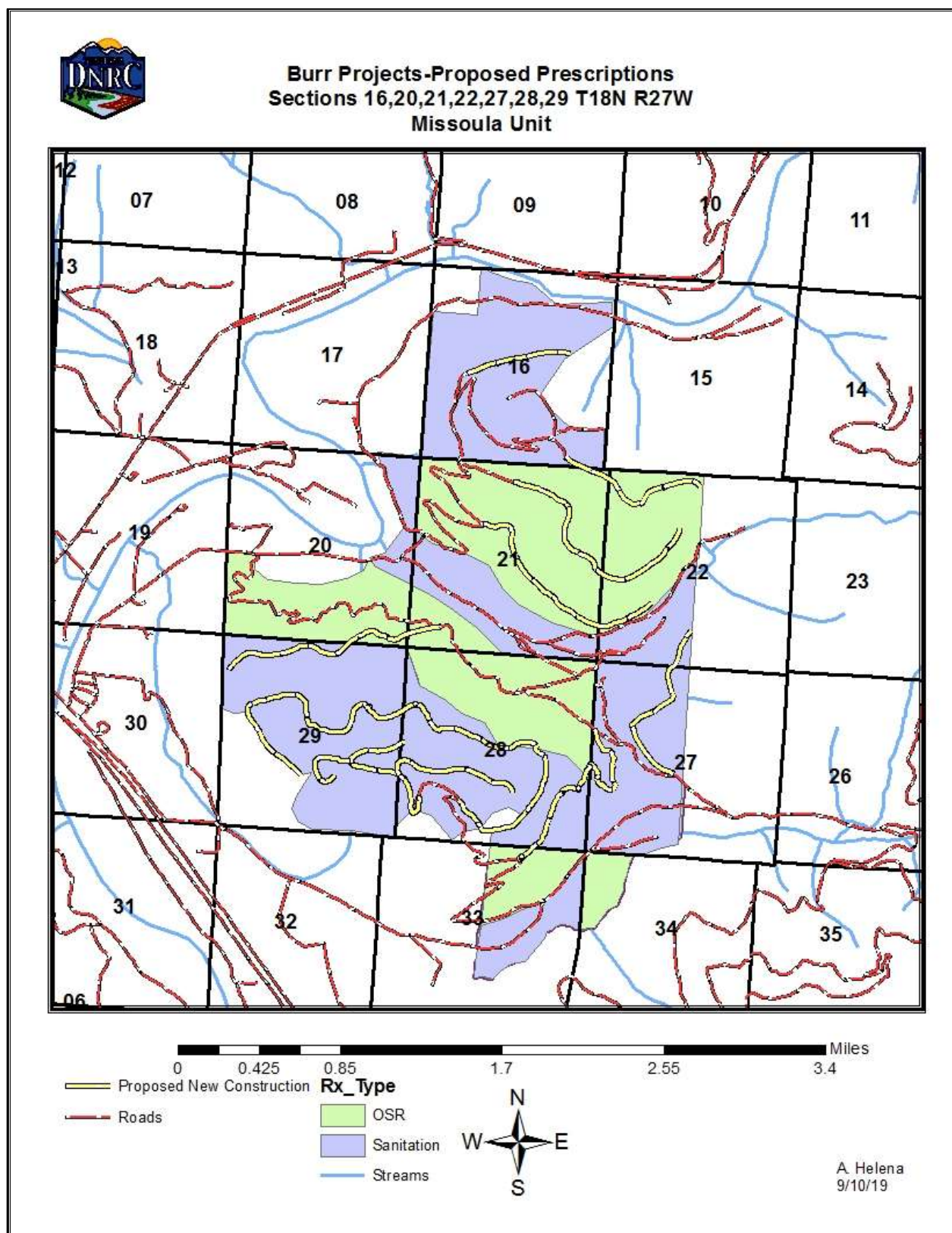
Environmental Assessment Checklist Approved By:**Name: Jonathan Hansen****Title: Missoula Unit Manager****Date: September 30, 2019****Signature:** *Jonathan Hansen*

Attachment A - Maps

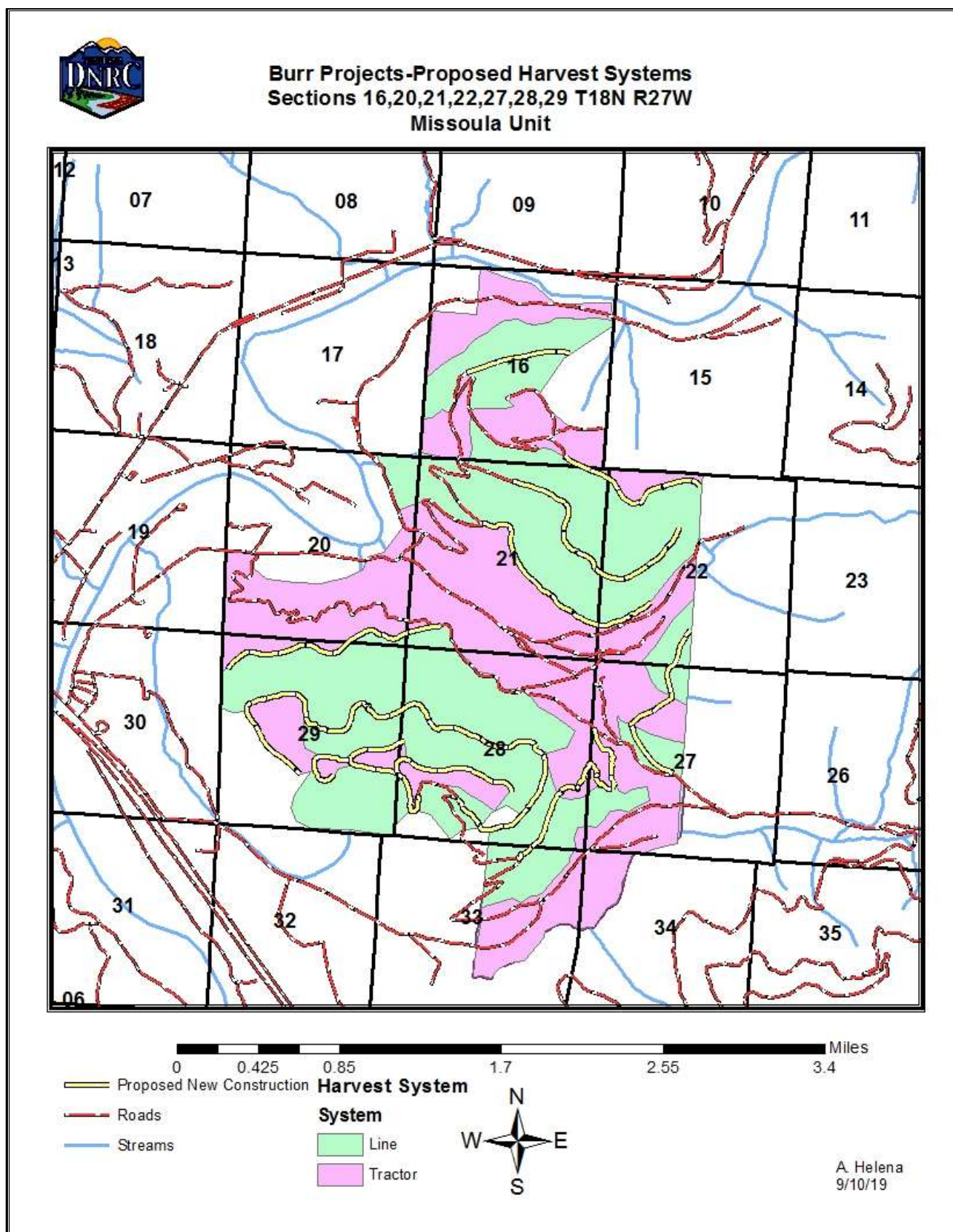
A-1: Burr Saddle Project Vicinity Map



A-2: Burr Saddle Project Map-Proposed Prescriptions



A-3: Burr Saddle Project Map-Proposed Harvest Systems



Attachment B – Vegetation

Burr Saddle Project – Vegetation Analysis

Analysis Prepared By: Bill Burdick

Title: Service Forester, Missoula Unit, Montana DNRC

Introduction

The vegetation section describes present conditions and components of the forest as well as the anticipated effects of both the No-Action and the Action Alternatives.

Issues

Issues and Concerns- The following issue statements were developed during scoping regarding the effects of the proposed action to vegetation:

- Timber harvesting and road building may introduce and spread noxious weeds in the project area.
 - Root rot may continue to cause mortality in the overstory.
 - Shade tolerant species would continue to out compete seral species-removing stands from their historic cover type and species distribution.
 - Young stands are currently overstocked with natural regeneration.
 - There is concern the proposed project could negatively impact populations of threatened, endangered, or sensitive plant species.
 - Forest Management activities may adversely affect Old Growth.
-

Regulatory Framework

The following plans, rules, and practices have guided this projects planning and/or would be implemented during project activities:

State Forest Land Management Plan (SFLMP)

DNRC developed the SFLMP to “provide field personnel with consistent policy, direction, and guidance for the management of state forested lands” (DNRC 1996: Executive Summary). The SFLMP provides the philosophical basis, technical rationale, and direction for DNRC’s forest management program. The SFLMP is premised on the philosophy that the best way to produce long-term income for the trust beneficiaries is to manage intensively for healthy and biologically diverse forests. In the foreseeable future, timber management will continue to be the primary source of revenue and primary tool for achieving biodiversity objectives on DNRC forested state trust lands.

DNRC Forest Management Rules

DNRC Forest Management Rules (*ARM 36.11.401 through 456*) are the specific legal resource management standards and measures under which DNRC implements the SFLMP and subsequently its forest management program. The Forest Management Rules were adopted in March 2003 and provide the legal framework for DNRC project-level decisions and provide field personnel with consistent policy and direction for managing forested state trust lands. Project design considerations and mitigations developed for this project must comply with applicable Forest Management Rules.

Montana Best Management Practices (BMPs) for Forestry

Montana BMPs consist of forest stewardship practices that reduce forest management impacts to water quality and forest soils. The implementation of BMPs by DNRC is required under *ARM 36.11.422*. Key forestry BMP elements include: streamside management; road design and planning; timber harvesting and site preparation; stream crossing design and installation; winter logging; and hazardous substances storage, handling, and application.

Montana DNRC Forested Trust Lands Habitat Conservation Plan (HCP)

DNRC is managing the habitats of threatened and endangered species on this project by implementing the Montana DNRC Forested Trust Lands Habitat Conservation Plan (HCP) and the associated Incidental Take Permit that was issued by the United States Fish & Wildlife Service (USFWS) in February of 2012 under Section 10 of the Endangered Species Act. The HCP identifies specific conservation strategies for managing the habitats of grizzly bear, Canada lynx, and three fish species: bull trout, westslope cutthroat trout, and Columbia redband trout. This project complies with the HCP.

Noxious Weed Applicable Weed Management Requirements

All applicable weed management requirements of the County Weed Control Act 7-22-2101 to 7-22-2153, Best Management Practices, State Forest Land Management rules and regulations, and measures outlined in the DNRC Habitat Conservation Plan would be implemented. This includes but is not limited to management rules for classified forest lands *ARM 36.11.445* where the department shall use an integrated pest management approach for noxious weed management that includes prevention, education, cultural, biological, and chemical methods as appropriate.

Analysis Areas

Direct and Secondary Effects Analysis Area

The proposed treatment area is approximately 3,299 acres.

- Harvest Treatment activities would occur on approximately 3,299 acres. Forest Improvement activities would also occur within this treatment area. In some instances Forest Improvement activities would overlap (for example piling and scarifying in conjunction with planting) in the same area.

Cumulative Effects Analysis Area

The proposed project area includes all or portions of (see table on page 3 for specific legal descriptions) the following sections:-Sections 16, 20, 21, 22, 27, 28, 29,32,33, 34 & 35 T18N R27W totaling 5,172 acres.

Existing Conditions

Noxious Weeds

Noxious weeds occurring in the project area parcels consist mainly of spotted knapweed (*Centaurea stoebe*) and spot infestations of Houndstongue (*Cynoglossum officinale* L), meadow hawkweed (*Heiracium pretense*), tansy ragwort (*Senecio jacobaea*) and Canada thistle (*cirsium arvense*).

Knapweed is extensive throughout the area, primarily along roads, grazing areas and the drier forested portions and old log landings of the project area. Introduction and continual spread of knapweed is from

current cattle grazing, past harvesting activities, past hauling and Off Road Vehicle (ORV) trespassers carrying knapweed seed along roads, old skid trails and new illegal ORV trails.

Houndstongue and hawkweed were found mostly along roadsides and grazed areas near roads in the project area. This has mainly been introduced from cattle grazing in the area. Moist sites with well-established surface vegetation provide a competitive advantage over noxious weed establishment. Weed management treatments on adjacent ownerships in the area are mostly non-existent.

Old Growth

Old Growth is identified and analyzed using criteria outlined in Green et al. Stand Level Inventories of the project area were queried to identify Old Growth stands. Once identified as Old Growth, plots were taken in these stands to verify classification. See table V-2 for current verified Old Growth within the project area.

Table V-2 –Old Growth in treatment area

Stand ID	SLI Old Growth Status	*Field Verified Old Growth Status	Old Growth Type	Acres of verified Old Growth
00007	Yes	No	N/A	0
00014	Yes	No	N/A	0
00015	Yes	No	N/A	0
00016	Yes	No	N/A	0
00017	Yes	No	N/A	0
00018	Yes	No	N/A	0
TOTAL				0 acres

**The "field verified Old Growth status" column indicates Old Growth status following field verification in which all the stands listed in the table were sampled.*

Standard Vegetative Community:

Stand History/Past Management-

This area falls within the Pend Oreille-St. Joe climatic section M333D, which historically was 98% forested. (Losensky, 1997). Climatic Section M333D is primarily in Idaho, with only a minor area in Montana where it covers parts of Mineral, Missoula and Sanders Counties. It includes the areas between the Coeur D' Alene Mountains, Ninemile Divide and the Bitterroot Range along the state boundary from Missoula to Heron. The west end of the Lolo Forest and the southern part of the Kootenai Forest is also included. A portion of the Thompson River State Forest may also be included in this climatic section.

This area is dominated by the maritime climatic influence with moderate temperatures and adequate moisture for vegetative growth on most sites except high energy south and west facing slopes. Annual precipitation ranges from 40 – 80 inches. Landforms are variable and include various mountain slopes, breaklands and glacier scoured areas in the northern portion. Granitics, belts, argillites and other parent materials are present in the area.

The project area ranges in elevation from 2600' - 5000'. The core of the area was dominated by the white pine type and probably represented some of the cover types best development. (Losensky, 1997). Climatic

Section M333D includes valley bottoms as well as high elevations from Lake Coeur d'Alene east to the Clark Fork Valley and then south including the Lochsa River and Palouse Prairie region. These areas were historically dominated by mature white pine with ponderosa pine and other mixed conifers. Pole size lodgepole pine minorly dominated the upper slopes, with the mature larch-Douglas fir type found in mixtures within the white pine type on slightly warmer sites. Fire suppression has played a large role in shaping these stands in the last 100 + years, which has changed the dominant forest type from a white pine to lodgepole type where stand replacing fires have occurred. Throughout the project area, there is evidence of both infrequent stand replacing fires and light ground fires. Evidence (fire scars on 200+ year old larch and ponderosa pine trees, thick stands of even age lodgepole pine) found during field recon indicates that these fires burned in the late 1800s and early 1900s.

Some logging occurred in the 1860's to support the mining activity near Superior. With the arrival of the Northern Pacific Railroad in the 1880's, timber immediately adjacent to the right-of-way was heavily cut for use in the construction of the railroad and for export to outside markets, including mines in Butte and other nearby areas.

By 1905, records indicate that most of the accessible timber in the area had been removed. After the 1910 Burn, nearby areas saw an increase in timber removal. By the 1930's, estimates found that about 12% of this climatic section in Montana had been logged.

As a result of the Lolo Land Exchange project in 2010, the DNRC acquired 1710 acres in the proposed project area from the Forest Service. Past harvest prescriptions within the newly acquired state ownership, included selection harvesting or high-grade harvesting of the remaining western white pine. The main reason for this species select harvest was to encourage whitetail winter habitat and open up the stands in an attempt to salvage western white pine since the introduction of white pine blister rust (*Cronartium ribicola*). After the 1910 fires and the high mortality rate to western white pine, the remaining western white pine stands were 80% infected with white pine blister rust (*Cronartium ribicola*).

According to Trust Land Management System (TLMS) records and other Timber Sale records, approximately 895 acres of the project area were harvested from 2002-2004. There have been other entries within some of the project area. Prior to the land exchange, there were timber harvest projects of approximately 300 acres. Harvests were concentrated to areas with slopes less than 40%. Most of the prescriptions were small, anywhere from 5-40 acres, and included:

- seed tree harvest
- selection harvest
- clearcut harvest

Other small scale timber sales occurred in the area from the early 1980's through the 1990's mostly on tractor ground in and around the Mill Creek area.

Currently these stands are a few years past the pre-commercial thinning stage with heights ranging from 25 to 40 feet and are about 15 to 30 years in age. They consist of Douglas-fir, western larch, ponderosa pine, lodgepole pine, grand fir, and western white pine (>5%).

The following series of aerial photos depict past and recent activity of Sections 16, 20, 21, 27, 29, 28, 33, 34 T18N R27W and taken July 31, 2000. The photo delineates State Land Inventory (SLI) polygons DNRC Trust Lands at the time.

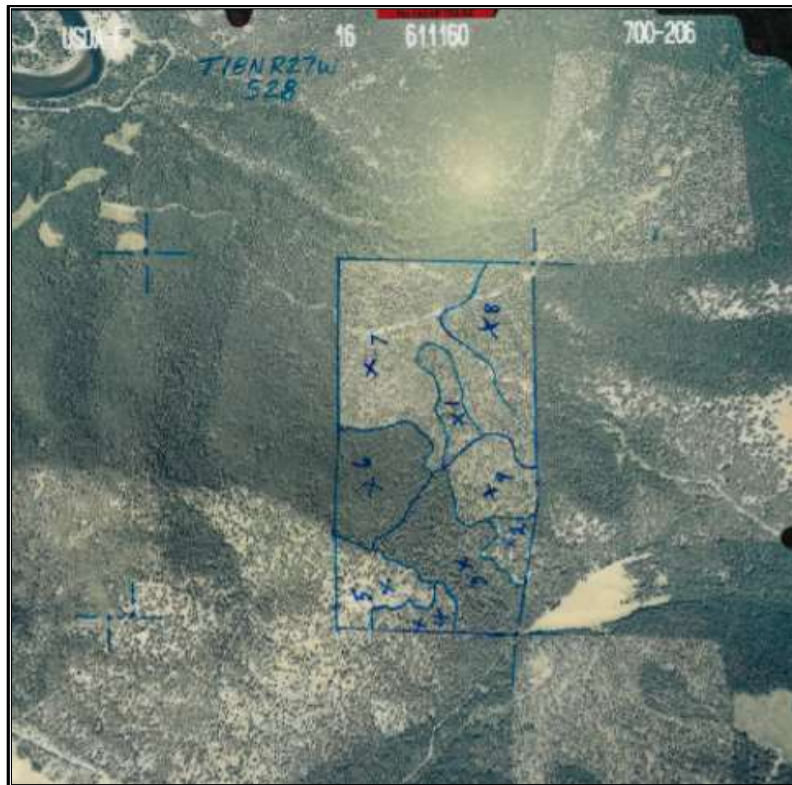


figure 1 Notice the eastern half of Section 28 recently harvested after this photo was taken and with SLI labeling.

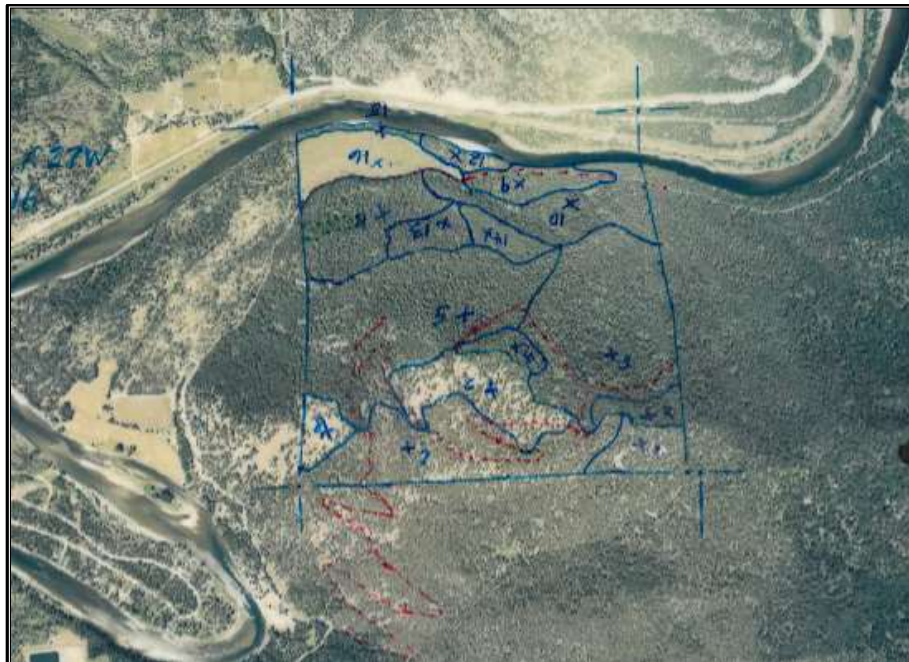


Figure 2: Aerial Photo 2000, Section 16 with SLI polygons. Notice the proposed road line (red) for future harvest systems. This section was harvested between 2002-2004 in the St. Regis Beetle Timber Sale



Figure 3: Aerial Photo taken July 2000. Section 20 with SLI Labeling. Harvested in the St. Regis Beetle Timber Sale 2002 -2004.

- **Current stand conditions**

The current stand condition in the project area are a result of past timber management and wildfire activity and/or suppression. The project area has an overstory consisting of 40% ponderosa pine 45% Douglas-fir, 10% western larch, <5% lodgepole pine, and <1% respectively of spruce, hemlock, grand fir. The *upper level* canopy has tree heights of 65-120 feet, diameters of 10-30" + dbh, with an average age of 60-120 years and is moderately to well stocked. The *mid-level* canopy throughout the project area has heights of 35-80 feet, diameters of 6-14" dbh, ages of 60-120 years and is poor to moderately stocked. Most of the projected volume for the proposed projects will come from the upper level and mid-level canopies. The

lower level canopy consists of 0-800 trees per acre with heights up to 30 feet, diameters 0-6" dbh and average ages being from 0 to 40 years. This lower level canopy is moderately stocked and exists throughout the stands and in openings.

The following table illustrates the current cover type in the Burr Saddle treatment area. Covertypes differs from the overstory species composition listed above.

Table V-1 – Current and appropriate cover type for the Burr Saddle Treatment Area.

Cover Type	Current Acres	Current Percent of Treatment Area	Desired Future Condition (DFC)	
			Acres	Percent
Subalpine fir	0	0%	0	0%
Douglas-fir	2	>1%	4	.3%
Lodgepole pine	7	>1%	0	0%
Mixed conifer	0	0%	57	1.7%
Ponderosa pine	2,064	62%	2,476	75%
Western larch/Douglas-fir	1,226	37%	762	23%
Western white pine	0	0%	0	0%
Non-stocked	0	0%	0	0%
Non-forest	0	0%	0	0%
Other (specify)	0	0%	0	0%
Total:	3,299	100	3,299	100

The current mortality rate in most of these stands ranges from 25 to 30 percent with most of the mortality being in the ponderosa pine and Douglas fir stands. Because of the current mortality rates, high amounts of coarse wood debris are being created mostly from mountain pine beetle infested portions of the stand where resources have become limited. Mortality among other species in the project area are mainly caused by a variety of root diseases and bark beetle infestations. This has created heavy portions of downfall which add to the increased fire hazard potential of these stands. Species composition, size, density and age class in the project area vary by past disturbances and aspect.

Stands with north aspect (N, NW and NE)

Stands with a northerly aspect, on flat slopes and those in deep draws are broken down into the following three tiers:

The ***first overstory tier*** contains western larch/Douglas-fir and ponderosa pine with occasional lodgepole pine and grand fir in the overstory. The trees range from 12-28" DBH and are spaced at about 10-25 foot apart in non-harvested areas. Ages range from 40 to 150+.

Areas that were previously harvested contain a three tier stand structure, with an overstory dominated by Douglas-fir, ponderosa pine and western larch 12"-26" DBH on a 15-40 foot spacing. These overstory trees

range in age from 60-150 years. About 30% of the Douglas-fir have high amounts of defect in the bottom third of the trees. Examples of defect include: fire scars, cat faces and other logging damage. The western larch also contain a significant amount defect which include dwarf mistletoe, fire scars, logging damage and pinii rot.

Most of these stands are medium to well stocked containing about 40% to 70% saw timber in both the overstory and understory. The majority of these stands have reached or surpassed their Mean Annual Increment of productivity at 79 – 105 ft³/acre/year.

Species composition in these stands consists of a dominant overstory of mature Douglas-fir, ponderosa pine and western larch, lodgepole pine and grand fir in the 20" + DBH range with heights ranging from 65' to 110'. Most of these overstory trees have survived the fires of 1910 and show some sort of fire scar or other abiotic damage to the boles as a result of the fire or other stresses to the trees.

Second tier

The **second tier** consists of the understory and co-dominants of these species which includes well distributed Douglas-fir, western larch and ponderosa pine and the occasional grand fir and lodgepole pine (0 – 10%) ranging from 4"-16" DBH with an average spacing of 5'-15' between stems spaced off the dominant overstory tier. This tight spacing has limited growth in these areas. Although these seral trees have smaller diameters, they range from 30-70+ years old and exhibit great growth potential. Most of the species in this tier are post 1910 Great Burn generation and have had good initiation only to be halted by competition for other resources from the more dominant first tier.

On average, stands in this second tier have about 20% defect. Some of the defect that is common among this second-tier stand are larch mistletoe in the western larch, twisted and bent boles from wind damage, poor genetics, mechanical and abiotic stem damage among ponderosa pine and Douglas-fir. The stand also suffers from western pine and bark beetle attacks. Signs of stress in the Douglas-fir are from various root diseases, Douglas-Fir beetle, bark beetle attacks and other defoliators. Less than 20% of all species among this tier are showing faded crowns, lack of cone production and lack of growth as competition for resources from the dominant overstory continues to grow and out compete these seral species.

The stocking level in this second-tier ranges from poorly to medium stocked with Douglas fir covering 20 – 49% of this second tier, and containing, up to 79% in a few stands. Western larch is stocked at 20 – 39% in most of these stands and in one instance up to 49% of the understory in of one of the SLI stands. Most of the tier 2 stands show good to average vigor throughout the project area.

Third Tier

The third tier is a mix of Douglas-fir, western larch and lodgepole pine advanced regeneration ranging in height form 2-20 feet tall and diameter range from 0"-4" DBH. Douglas-fir is the dominant species existing in clumps, with western larch and lodgepole pine also well represented in swales and draws and any canopy openings or old clearcuts. All species are well represented in this tier and range in ages from 0-39 years old with one stand showing ages up to 69 years old. This level of the canopy displays good to average vigor and in some cases showing full vigor and poor vigor in the older aged portions of tier 3 stands. Current stocking levels range from 500 to 1,000 stems per acre.

Stands with south aspects (S, SW and SE)

In stands on south facing aspects, the current cover type is dominated by ponderosa pine in both the overstory of post 1910 trees and in the secondary co-dominant understory. In some of these south facing stands Douglas-fir is found in the understory but at lower elevations with some sort of shade protection via

a mountain, draw or low valley flat. The existing Douglas-fir is mostly post 1910 burn and, in some cases, has entered the main canopy overstory and is encroaching upon the dominant pine element. In these dominant ponderosa pine stands, there is much less understory vegetation in the form of brush unless it is lower on the slope and in draws, swales and valley bottoms. In highly shaded and lower elevation areas, most of the understory vegetation consists of ninebark, kinnikinnick, pine grass and starry Solomon-seal. Pine grasses occur on more direct south-facing slopes, while starry Solomon-seal occurs on shaded more protected thicker pine stands of westerly and eastern south-facing slopes. Douglas-fir is the climax species for these stands.

The Desired Future Conditions for all these stands is ponderosa pine. On these southerly slopes there are two types of tiers, which are dominated by Douglas-fir with secondary ponderosa pine overstory and those that are completely ponderosa pine dominant.

The following tiers are broken down into Forest Types and tiers. The first analysis is of the Douglas-fir and Douglas-fir/western larch forest type. The second analysis is of the ponderosa pine forest type.

Douglas-fir and Douglas-fir/western larch type

First Tier

Regarding the ***Douglas-fir and Douglas-fir/western larch forest type tier 1***, the overstory in these south-facing stands consists of about 40 - 69% Douglas-fir with ponderosa pine consisting of 20 -39%. Average age of the stands are 120 years old with spacing about 10 – 40 feet apart with average DBH of 15" with a mean height of 80'. Average volume per acre are about 12.5 mbf with 15-20% defect. They have stocking levels of medium to well stocked. The current MIA for this tier is 70 feet³/acre/year. Currently, stands are showing signs that growth has started to slow below the potential/expected rates when compared to growth rates in similar stands.

Approximately 10 tons of Coarse Wood Debris exists per acre.

Some of these stands were previously harvested, with most of the activity occurring on the edges of the stand. This was a result of targeting higher volume stands with more gentle slopes. Approximately 1/3 of this first tier stand was acquired in the Lolo Land Exchange in 2010. Prior to DNRC ownership, the Blazing Saddles project took place. This project focused on fuels reduction and had minimal volume harvested from the first tier stand.

Second Tier

The ***second tier*** consists of well distributed Douglas-fir, western larch and ponderosa pine and the occasional grand fir and lodgepole pine (0 – 10%) ranging from 4"-16" DBH with an average spacing of 5'-15' between both second tier and dominant overstory tier stems. This tight spacing has resulted in limited growth in these areas, as compared to the full potential of the overstory stand. Although these seral trees have smaller diameters, they range from 30-70+ years old and exhibit great growth potential. Most of the species in this tier are post 1910 Great Burn initiation but are currently being out competed for available resources from the dominant primary tier, which has caused reduced growth and vigor.

Third Tier

The third tier is a mix of Douglas-fir, western larch and lodgepole pine advanced regeneration ranging in height from 2-20 feet tall and diameters range from 0"-4" DBH. Douglas-fir is the dominant species existing in clumps, with western larch and lodgepole pine also well represented in swales and draws and any canopy openings or old clearcuts. All species are well represented in this regeneration tier and range in ages from 0-39 years old. Current stocking levels range from 500 to 1,000 stems per acre.

Ponderosa Pine type**First Tier**

The current overstory as well as the DFC is ponderosa pine. Most of these stands contain smaller encroaching ponderosa pine as a result of fire suppression since 1910. Historically, ponderosa pine stands evolved with high frequency/low intensity fire regimes. In this case, fire suppression has led to a younger dense ponderosa pine understory accompanied by Douglas-fir which has overcrowded the understory and is encroaching into the overstory resulting in stress within these stands caused by too many stems per acre. Limiting resources to the few dominant cohorts has resulted in faded tops from Elytroderma needle casts, beetle attacks, root rots, and attacks from other defoliators. There is about 30% defect among all species in these stands due to stress from a lack of available resources.

The average age is 120 years with the youngest stands being 106 years old and the oldest being 149 years old. The Mean Annual Increment for this tier is about 63. Average dbh is 18" with average heights of 75 feet. However, these stands are dominated by small diameter trees in the overstory. Most of the dominant trees have a dbh of 18-22" with an occasional 30+" tree. The overstory contains 60% to 100% ponderosa pine with the Douglas-fir making up 20- 30% of the overstory while western larch makes up the remainder at 0 -10%. Trees are spaced out approximately 8-35' apart. Occasionally clusters of trees can be observed growing in the shade of larger trees. These clusters are approximately 30-40 feet apart and the trees within them are spaced 5-10 feet apart.

Second Tier

Tier 2 consists of the second story codominants of ponderosa pine and Douglas-fir. Species composition is ponderosa pine 60-100% and Douglas-fir 0-40% (an occasional western larch or grand fir may exist, but rare). This second tier shows moderate stocking. Overall vigor is good to average with these trees having an average dbh of 16", an average height of 70 feet and average age of 90 years. This tier contains approximately 15% defect.

Third Tier

This third tier consists of ponderosa pine, Douglas-fir and grand fir. This species composition occurs at the lowest level canopy and mostly consists of Douglas-fir and grand fir regen. The average dbh is 9" and average height is 30-40 feet with an average age of 30 years old. 10-15% defect is present in this tier.

Species of Concern

A search of sensitive vascular plants in the Montana Natural Heritage Program resulted in three species of concern being identified as potentially existing within the treatment area.

1. Yerba Buena (*Satureja douglasii*) has a global ranking of G5 and a state rank of S3, which means that it is Common, widespread, and abundant (although it may be rare in parts of its range). Not vulnerable in most of its range and that it's at risk of extinction or extirpation in the state due to **limited** and/or **declining** numbers, range and/or habitat, even though it may be abundant in some areas.
2. Cascade reedgrass (*Calamagrostis tweedyi*) has a global ranking of G3 and a state rank of S3, which means that it is at risk of extinction or extirpation in the state due to **limited** and/or **declining** numbers, range and/or habitat, even though it may be abundant in some areas.
3. Clustered Lady's slipper (*Cypripedium fasciculatum*) has a global ranking of G4 and a state rank of S3, which means that it is Apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining and that it's at risk of extinction or extirpation in the state due

to **limited** and/or **declining** numbers, range and/or habitat, even though it may be abundant in some areas.

Environmental Effects

No Action Alternative: Direct, Secondary and Cumulative Effects

Under the No Action Alternative, natural processes would continue to have a direct influence on forest conditions. Bark Beetle attacks, root rots, needle cast, branch, terminal and stem diseases would continue to cause mortality in the ponderosa pine, Douglas-fir and western larch across all size classes. Fuels would continue to accumulate in stands of ponderosa pine, increasing the potential for catastrophic wildfire. In areas not impacted by root rot, Douglas-fir would continue to out compete ponderosa pine and western larch across all age classes, further removing the stands from their desired future condition.

With no action, noxious weeds would continue to spread along roads and fields and may increase on the drier site habitats. Limited weed control efforts on access roads, across multiple ownerships in the area would increase the protentional for spread by windblown seed, illegal ATV and cattle use. DNRC would continue to treat selected sites on DNRC roads based on priorities and funding availability, but the levels of weed control treatments would be lower than with the Action Alternative. If new weed invader species were found they would have highest priority for management. On state land parcels the grazing licensees would be required to continue weed control efforts consistent with their use.

Cumulative effects of noxious weeds within the project area are moderate. Weeds have mostly spread along the road system passed from wind, wildlife, traffic or forest management vehicles and grazing cattle. As tree density and ground cover vegetation increase over time, weeds are reduced through vegetative competition.

Action Alternative: Direct, Secondary, and Cumulative Effects

Noxious Weeds

Direct, Secondary & Cumulative Effects

Implementation of the Action Alternative would involve ground-disturbing activities that have the potential to introduce or spread noxious weeds in susceptible habitat types. An Integrated Weed Management (IWM) approach would be considered for treatment of existing and prevention of potential noxious weeds. For this proposed project: prevention, revegetation of new roads and weed control measures on existing roads were considered the most effective weed management treatments.

Prevention measures would require cleaning off-road equipment. Road sides would be sprayed prior to operations and weed control and revegetation would slow noxious weed spread and reduce weed density and occurrence compared to no-action. There would be a similar or potential slight increase in weed infestation within harvest units due to soil disturbance and reduction of tree canopy. The silvicultural prescriptions are designed to control disturbance while achieving the scarification goals needed for sustained forest growth. Cable harvesting activities would result in low disturbance. Ground based skidder harvest activities would create higher disturbances in the skid trails and landings. The noxious weed control efforts would promote rapid revegetation and emphasize treatment of any new noxious weeds found.

Herbicide application would be completed on segments of DNRC roads along the haul route to reduce weed spread along roads and promote desired vegetation for weed competition. Herbicide would be applied according to labeled directions as well as all applicable rules and regulations, and would be applied with adequate buffers to prevent herbicide runoff to surface water resources. Implementation of IWM measures listed in the mitigations would be expected to reduce existing weeds, limit the possible spread of weeds,

improve current conditions, and promote existing native vegetation. More weed control would occur compared to the no-action alternative and grass and competitive vegetation would increase along roads.

Overall cumulative effects of increased noxious weeds within the project area would be moderate based on herbicide treatments of existing weeds along roads and implementing prevention measures to reduce new weeds, by cleaning equipment and planting grass on roads to compete against weeds. The combined efforts of weed control across ownerships continues to improve through cooperative efforts with the Mineral County Weed District, the grazing lessee and local weed control interest groups.

Old Growth

Direct, Secondary & Cumulative Effects

Six stands were initially identified in the Stand Level Inventory as being Old Growth. Followup field verification indicated that they did not meet the minimum specifications outlined in Green et al. Therefore, there is no Old Growth in the treatment areas. There are scattered large/old trees in the treatment area but no stands meeting the minimum standards to reach Old Growth designation. Because no Old Growth currently exists in the treatment area the Action Alternative will have no direct, secondary or cumulative effects on Old Growth.

Standard Vegetative Community

Direct, Secondary & Cumulative Effects

The proposed Action Alternative would treat approximately 3,299 acres out of the 5,172 acre analysis area. Treatment type and size would vary based on stand conditions. The proposed treatment types would include:

- **Tree planting** would occur on approximately 2,000 acres. Areas currently experiencing high amounts of root rot, and subsequent mortality in the Douglas-fir and would be planted with western larch or ponderosa pine.
- **Pre-commercial thinning** would occur on approximately 1,000 acres of overstocked sub-merchantable stands to promote diverse cover types. Pre-commercial treatments would favor western larch, ponderosa pine, Douglas-fir and lodgepole pine with the priority being trees displaying good genetics. Grand fir would be targeted for removal, as well as any trees displaying signs of insects, disease and defect such as forked tops. Pre-commercial thinning projects would reduce the stand density to 200-300 trees/acre. This would occur in stands with high density understories post-harvest and in stands that are currently stagnant.
- **Pile, scarify and slashing** would occur in areas with high concentrations of slash, stagnant stands that will not release with a pre-commercial thin or areas with a heavy brush load. These treatments may occur on 4,541 acres to promote natural regeneration or prep sites for planting.
- The initial **Burr Saddle Timber Sale** would be designed to promote desired future conditions and emulate natural disturbances based on fire regimes historically present in the project area. Harvesting would occur across 364 acres in the 3,299 acre treatment area, removing approximately 50-60% of the overstory. The prescriptions would be a combination of overstory removal, and sanitation; leaving ponderosa pine, western larch and healthy Douglas-fir in the 8"-30+" dbh range on a variable spacing (based on historic stand conditions). Post harvest stand appearance would resemble a natural disturbance with scattered clumps remaining, as well as unevenly spaced overstory trees. The overstory would be dominated by ponderosa pine, western larch and Douglas-fir with a stand density of 20-60 trees/acre, depending on the site and stand characteristics. At least two snag and snag recruits per acre would exist scattered among the overstory component. Advanced regeneration would be protected during harvest activities.

- The **subsequent timber sales and/or timber permits** would have a selection and overstory removal prescription. Harvest would take place on approximately 2,935 acres not previously harvested during the Burr Saddle Timber Sale. In overstory removal areas, the overstory component would be removed leaving at minimum two snags and two snag recruits per acre. In sanitation areas, stands would be harvested similar to what would occur in the Burr Saddle timber sale with post harvest stands resembling a natural disturbance with scattered clumps remaining as well as unevenly spaced overstory trees. The overstory would be dominated by western larch, ponderosa pine and Douglas-fir with a stand density of 20-40 trees/acre, depending on the site and stand characteristics. At least two snag and snag recruits per acre would exist scattered among the overstory component. Advanced regeneration would be protected during harvest activities.
- Fuel loading concerns would vary according to the pre-harvest stand. In accordance with ARM 36.11.410 and ARM 36.11.414 the majority of fine slash foliage and approximately 5 to 15 tons of coarse woody debris would be left scattered on the forest floor in all harvest units. This would increase the intensity and reduce the ability to control ground fires in all harvest units for approximately three years. In stands that have numerous leave trees following harvest this could result in ground fires killing trees and an increased risk of crown fires. In areas with few leave trees the risk of a catastrophic crown fires would decrease.

Sensitive Plants

Direct, Secondary & Cumulative Effects

Three sensitive plant species were identified in the Montana Heritage Tracker website. During field reconnaissance none of the plants were identified within the proposed Burr Saddle timber sale. Efforts would continue to be made during subsequent harvest activities to identify populations and protect them when identified within a harvest unit. If plants are identified during harvest operations, efforts would be made to limit disturbance to plant populations. However, road building activities may impact individual plants if they are within the proposed road right of way. Given the fact that impacts may occur as a result of road building the Action Alternative has the potential to have a moderate effect on small plant populations within the treatment area.

Given the following factors:

- Douglas-fir across all size classes are currently succumbing to root rot.
- Ponderosa pine of all size classes are showing signs of stress from various defoliator and needle diseases.
- Post harvest, the overall stand health and vigor would be improved in the residual overstory.
- Most shade tolerant species and species displaying poor genetics would be removed, favoring seral species.
- Areas would be pre-commercially thinned promoting growth and vigor in younger age classes.
- Tree species resistant to root rot would be planted.
- Noxious weed populations would be managed with the intent to control the spread of weeds and implemented throughout the project area and would include prevention, biological and chemical methods and prompt revegetation with native species plants and grasses.
- Where sensitive and rare plants are found, their specific habitats and needs would be considered and protected appropriately from disturbances and activities within the project area.

The proposed Action Alternative would be expected to result in low to moderate direct, indirect, and cumulative impacts on forest vegetation beyond those projected for the No Action Alternative.

Vegetation Mitigations

Recommended Mitigation Measures for Vegetation- The analysis and levels of effects to vegetation resources are based on implementation of the following mitigation measures.

- Wash equipment prior to harvest operations to limit noxious weed spread.
- Plant grass seed on new roads to expedite grass establishment and limit weed potential
- Favor western larch and ponderosa pine to limit effects of root rot in the project area
- Plant western larch and ponderosa pine in root rot infected areas to convert stands to a resistant species
- Prescribe a overstory removal/sanitation harvest in order to emulate natural disturbance historically present on the landscape.
- If sensitive plant species are identified during harvest operations avoid disturbance to the individual plants whenever possible.

Recommended Mitigations and Adjustments of Harvest Treatments for the Benefit of Other Resources

- *Snags, snag recruits, and coarse woody debris will be managed according to *ARM 36.11.411* through *36.11.414*, particularly favoring western larch. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.
- Retention of patches of advanced regeneration of shade-tolerant trees, such as sub-alpine-fir and spruce, in units containing lynx habitats would break-up sight distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx.
- In pre-commercial thinning units, retain small shade tolerant trees (such as sub-alpine fir and spruce to provide potential habitat structure for snowshoe hares by increasing the levels of horizontal cover and accelerating the development of multi-storied stands.
- Provide connectivity for fisher, Canada lynx, and a host of other species by maintaining corridors of unharvested and/or lighter harvested areas along riparian areas, ridge tops, and saddles. Design a heavier retention corridor through the Mill Creek drainage that is at least 300 feet wide with 40% or more canopy closure following treatments that could facilitate movements and provide some landscape connectivity.

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Attachment C – Soils

Burr Saddle Project – Soils Analysis

Analysis Prepared By:**Name: Andrea Stanley****Title: Hydrologist/Soils Scientist, Montana DNRC**

Introduction

The following analysis will disclose anticipated effects to soil resources within the Burr Saddle project area. Direct, secondary, and cumulative effects to soil resources of both the No-Action and Action alternatives are analyzed.

Issues

Timber harvest, site preparation, road construction/maintenance, and vegetation management can alter factors that influence short-term and long-term soil health and productivity. Soil productivity must be maintained to sustain ecological resilience and productivity which in turn will maintain long-term return to state trust beneficiaries.

Soil resources may be adversely affected by implementation of the project. Issues include the following:

- slope stability
- erosion
- physical disturbance (compaction and displacement)
- nutrient cycling and soil productivity

No soil resource related comments were received during scoping. Evaluating for the above issues will address issues known to be associated with activities similar to the proposed project. These issues listed above are discussed in greater detail below:

Erosion

Water and/or wind erosion of soils is a natural process that can be accelerated by activities that:

- remove cover materials that protect the soils from erosion such as vegetation, woody debris, and duff.
- increase surface flow by reducing infiltration capacity, concentrating runoff, and/or reduced vegetative interception and/or transpiration.

Accelerated erosion generally equates to soil losses that exceed what would occur naturally and losses that exceed the natural regeneration of soil. Soil erosion can have secondary effects including sedimentation of surface waters. Analysis of road erosion and drainage issues is in the following water quality section because of the propensity of road erosion and drainage issues to effect water quality. Hillslope, including skid trail, erosion is analyzed in this section.

Types of erosion include sheet, rill, and gully erosion. Site sensitivity to erosion accelerated by site activities is governed by existing site conditions such as soil composition (minerology and grain size distribution), slope, and past management practices such as effective use of Best Management Practices (BMPs).

Physical disturbance (compaction and displacement)

Soil compaction may occur when equipment or other materials moves or is placed on soils. It is a process in which soil bulk density is increased and macroporosity is decreased, which results in a platy, massive soil structure in more severe cases. Associated is a decrease in infiltration rate, permeability, and soil aeration. Soils with less bearing strength are more susceptible to compaction. Soils with coarser textures (i.e., higher sand or gravel component) tend to have a greater bearing strength than fine silt and clay-based soils. Soils with moisture are also much more vulnerable to compaction than those in a dry state.

Soil displacement is a process in which soil is displaced mechanically by the movement of equipment or other materials over them. Soil displacement can reduce the amount of soil nutrients and moisture capacity available to plants and may expose less fertile subsoils and mineral soils. Soil displacement can increase potential for runoff and erosion.

Nutrient cycling and Soil productivity

Soil nutrient availability and natural replenishment by the breakdown of organic matter and rock weathering are essential to forest productivity and sustainability.

Coarse (CWD) and fine (FWD) woody debris provides many necessary functions to sustain soil productivity and includes site moisture retention, soil temperature modification, soil protection, nutrient cycling as well as providing a long-term supply of soil wood which is paramount to soil microbial activity (Harmon et al. 1986). Amounts of CWD and FWD are quantified by tons/acre which is calculated from transects as described in the Analysis Methods section. These values can vary within a project area and are dependent on factors such as those that influence moisture and decay rates and factors that affect tree and limb mortality. Forest management activities have the potential to modify both amounts and trends of recruitable material and in turn the long-term productivity of the soil.

Slope stability

Slope stability is the ability of material on a slope to remain in equilibrium (stable) and therefore represents some balance between driving forces (shear stress) and resisting forces (shear strength). Many variables, both natural and/or anthropogenic, may affect either driving or resisting forces. Factors that govern shear strength are the internal friction of the slope (determined by factors associated with the composition of the material on the slope such as grain size and shape, the presence of plane surfaces, moisture, and mineralogy). Activities that increase shear stress are removal of lateral support (e.g., erosion and road cuts) and increased moisture associated with reduced vegetation (interception and transpiration).

The risk of slope instability on state lands is small because the area subject to instability occurs in localized areas in less than six percent of all lands (SFLMP). Slopes over 65% are considered the highest risk of instability because 65% is the normal angle of repose and stability for most landscape materials. These areas often have shallow soil mantles with exposed bedrock that are stable (SFLMP). Based on observation and professional judgment, road construction and recent fire on slopes greater than 45% are the areas on state land that warrant an analysis for slope stability.

Regulatory Framework

The following plans, rules, and practices have guided project planning and/or would be implemented during project activities:

- The Montana Department of Natural Resources and Conservation (DNRC) Forested Trust Lands Habitat Conservation Plan (HCP; USFWS and DNRC 2010)
- The Montana Code Annotated, specifically Title 77, Chapter 5.
- The Administrative Rules of Montana, specifically Rule Chapter 36.11
- The Montana Forestry Best Management Practices (Voluntary, but considered as management requirement for State Lands)
- The Montana Streamside Management Zone Law
- The State Forest Land Management Plan (DNRC, 1996)
- The Stream Protection Act (SPA)

Analysis Areas

The Burr Saddle project area is 5,172 acres of which 1,995 acres would be treated with a sanitation harvest and 1,304 acres would be harvested with an overstory removal prescription (*Attachment A-1 through A-3*). The analysis area for direct, and indirect effects to soil physical properties, nutrient cycling, and site productivity is the 3,299 acres proposed for harvest units and landings. The effects of proposed temporary and permanent road construction (20 miles) and existing road maintenance is assessed in the water quality analysis section of this EA.

Cumulative soil effects are defined in MEPA as the collective impacts on the human environment when considered in conjunction with other past, present, and future actions related the proposed action by location and generic type. Cumulative impact analysis includes a review of all known state and nonstate activities that have occurred, are occurring, or may occur that have impacted or may impact the same resource as the proposed action.

Cumulative effects to soil resources are analyzed here at the project area scale. Temporally, cumulative effects to the soils resource are analyzed to include known past activities that have occurred, current management, and anticipated future activities and management within the project area.

Analysis Methods

This assessment begins with a characterization and evaluation of the **existing conditions** within the assessment areas. This informs both potential site sensitivities to soil impacts (e.g., steep and unstable slopes) and also the likely condition that would persist under the No Action Alternative (e.g., existing disturbance areas). Below is a list of the data and analysis methods used for characterizing existing conditions:

- published geologic maps and reports
- topographic data and maps

- Natural Resources Conservation Service soil survey data
- Past and current DRNC land and forest management data
- DNRC grazing license and lease data
- On-site observations including observations on geology, soils, slopes, historic road and skid trails, vegetation, and CWD.

To evaluate the **potential environmental effects of the Action and No Action Alternatives** within the assessment areas, we consider impacts typical to timber harvest, associated infrastructure and activities including skid trails, landings, vegetation/fuels management including slash treatment, weed management, and seeding/planting including soil prep such as scarification by dispersed skidding.

Note that the environmental effects associated with roads to soils include loss in soil and productive ground within the footprint of the road prism. The environmental effects of roads are analyzed more comprehensively in the water resources section of this EA because of the existing and potential risk associated with stream crossings and sediment delivery from road and fill surfaces.

Existing Conditions

Below is a summary of the key soil, geologic and geographic site conditions and findings for the project area:

- Rock types on hillslopes within proposed harvest units and road construction areas are quartzites and argillites with rock outcrops and soils with a high composition of angular rock and volcanic ash. The rock provides for slope stability. The volcanic ash is nutrient rich and susceptible to erosion if disturbed and/or not protected with duff or vegetative cover.
- The valley floors are filled with fine alluvial, lake, and flood deposits of silts and clays that are erodible but because of their flat topography, have a low risk of erosion.
- Project area elevations range from 2,600 to 5,000 feet above mean sea level.
- Within harvest units, slopes range from 0 to 70%, with occasional steeper areas and rock outcrops.
- Noxious weeds are present throughout the project area. Species present include knapweed, houndstongue, and oxeye daisy.
- No unstable or unique geologic features have been observed in the project area.

Geology

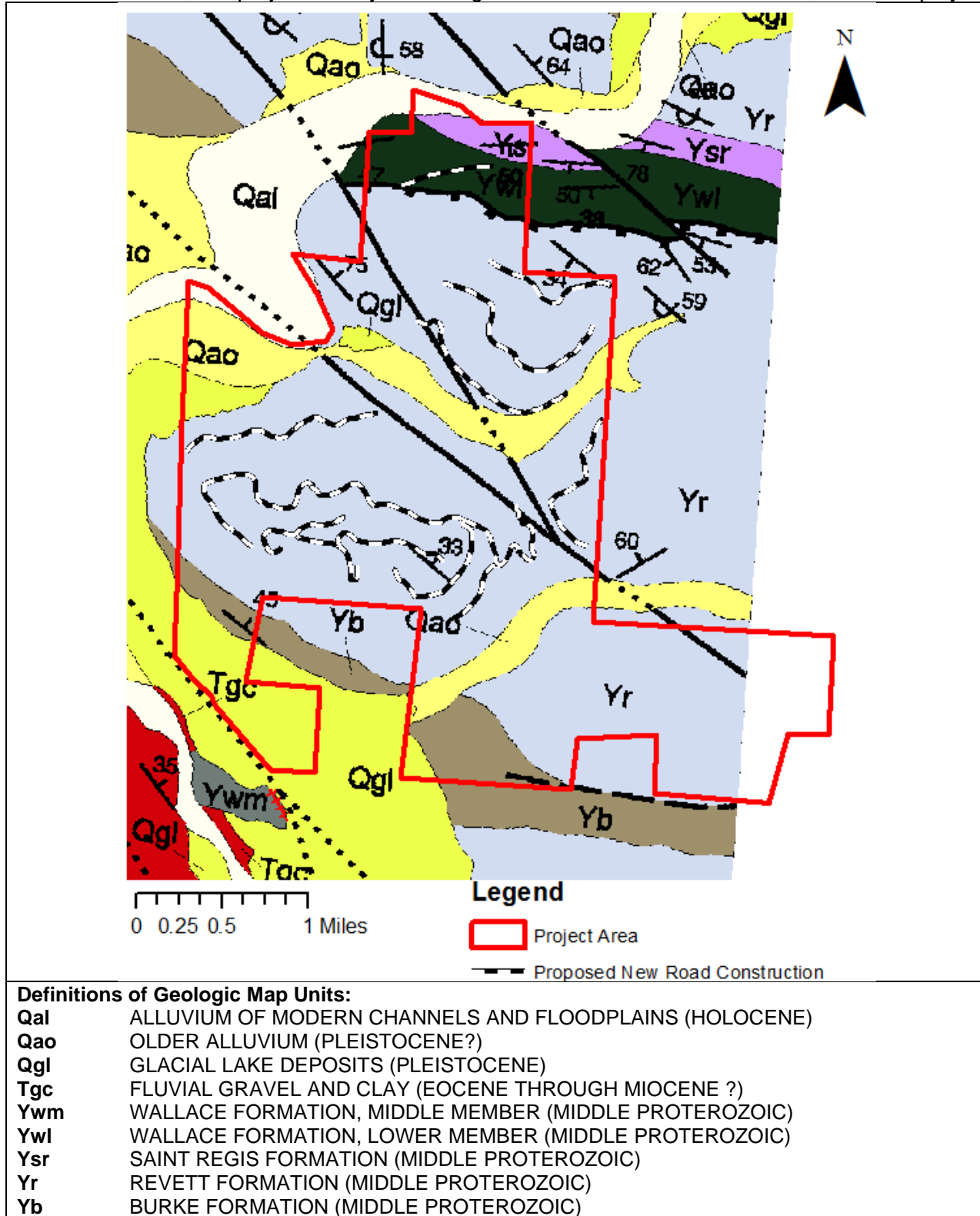
The project area is located in mountains adjacent to the Clark Fork Valley and east of St. Regis. The project area is drained by tributaries to the Clark Fork, including the Fourmile and Mill Creek watersheds. The local geology and rock types of the project area are described in geologic compilation completed by Lonn and McFadden (1999). Geologic information relevant to the project and project area is shown in the geologic map in Figure S1.

Underlying rocks include the Revett (Yr), Wallace (Ywl), Saint Regis (Ysr), and Burke (Yb) Formations. All middle Proterozoic sedimentary rocks are folded and tilted beds of mostly quartzites and argillites. These sedimentary rock layers are generally dipped to the southwest in the northern project area and north of Mill Creek; and are dipped to the north in the southern portion of the project area. This rock is obvious in the project area with rock outcrops and a high rock content in most project area soils.

Lower elevations of the project area at the bottom of draws are deposits of rounded course to fine alluvium (Qao) and fine (silt and clay) glacial lake sediments (Qgl). These materials are fine-grained and have a lower rock component making them more sensitive to rutting and erosion.

No unstable or unique geologic features were observed in the project area.

Figure S-1: Project area geology summarized from information published by Lonn and McFadden (1999). Road construction, the project activity with the greatest soil and rock disturbance, is also displayed.



Soils

The project area is located in Mineral County and project area soils are mapped in the Lolo National Forest Area soil survey (NRCS 2018). A list of surveyed soil map units and descriptions surveyed within the direct analysis area are listed in Table S-1. Table S-1 also lists soil properties relevant to risk associated with the soil properties and type occurring within the top 18 inches of soil unit profiles. This risk assessment accounts for the top 18 inches only because this upper soil layer is the most vulnerable to the effects of erosion, displacement, and compaction. Past research has found that compaction depth, although variable, is generally the most severe in the first few inches and negligible beyond 18 inches (Adams and Froehlich, 1981). Also listed within Table S-1 are the proposed project activities and the risk for erosion, compaction, and displacement given the surveyed soil properties, topography, and proposed activities.

Most soils within the direct analysis area have high rock content and a low to moderate erosion risk. Most of the soils in the project area are classified as gravelly loam. However, variability in soil series types across the project area are the consequence of variable parent material, elevations, slopes, and aspects. Higher elevations in the southern portion of the project area have a quartzite and argillite parent material with areas of exposed bedrock and scree. Deep silty soils at the bottom draws on the north side of the section would be sensitive to rutting and erosion. Volcanic ash is included within the soil horizons of much of the project area. This ash is high-value nutrient-rich and is also fine-grained and vulnerable to wind and water erosion if disturbed and left exposed (McDaniel and Wilson, 2007).

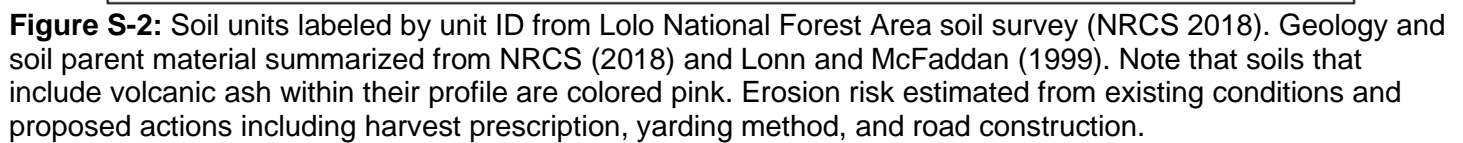


Table S-1: Soil unit descriptions. Soil units, descriptions, AASHTO classification, hydrologic soil group, percent rock fragments, and erosion factor (Kw) from soil unit mapping and descriptions provided by the NRCS (2018). Parent material determined from both information provided by Lonn and McFadden (1999), and the NRCS (2018). (Descriptions of information contained in each column are explained on the following page in Table S-2.)

Soil Map Unit			Portion of direct analysis area (%)	Slopes (%)	Soil Unit Description: & Parent Material	Hydrologic soil group	AASHTO classification, & interpretation	Rock fragments (%)	K _s	Timber Harvest	Road construction	Yarding method	Erosion Risk	Compaction Risk	Displacement Risk	Other notes
A	B	C														
NRCS soil data summary																
16UA	35	20-40	Wellie- Wakepish families, association, hills and alluvial fans; undifferentiated alluvium and/or colluvium, and volcanic ash over undifferentiated colluvium	A/B	A- 1 (A- 4, A- 2); good to fair sub-grade rating	0	0.1	Sanitation, OSR	yes	tractor & line	L	L	L			Where most road construction is proposed, beds are tilted -30° downslope.
22UA	26	15- 60	Wakepish- Wilde- Sixteenmile, very stony families, complex, flood scoured footslopes; colluvium derived from metasedimentary rock, volcanic ash over colluvium derived from metasedimentary rock	B	A- 2 (A- 6, A- 1); good to poor sub-grade rating	0- 1	NR	Sanitation, OSR	yes	line	L	L	L			Bedrock outcrops common. Where most road construction is proposed beds are tilted -45° downslope.
30Q A	13	20- 60	Lostbasin- Bergquist families, complex, moderately steep mountain slopes; colluvium derived from metasedimentary rock	B	A- 4 (A- 2, A- 1) fair sub-grade rating	7- 16	NR	Sanitation, OSR	yes	tractor & line	L	L	M			Bedrock outcrops common. Where most road construction is proposed beds are tilted -45° inslope.
13UB	7	0- 15	Mitten- Holloway families, association, high stream terraces and escarpments; volcanic ash over alluvium and/or slope alluvium derived from metasedimentary rock, and slope alluvium and/or colluvium derived from metasedimentary rock	B	A- 4 (A- 2, A- 1) fair sub-grade rating	0- 31	NR	Sanitation, OSR	yes	tractor	L	L	L			Bedrock outcrops common.
13JA	5	0- 35	Stryker and Wickware families, high stream terraces and escarpments; alluvium and/or slope alluvium and/or colluvium derived from metasedimentary rock	C	A- 4 (A- 6)	0	NR	OSR and Sanitation	no	tractor	L	M	L			
60Q D	4	45- 70	Dewberry family, very stonyRock outcrop- Mitten family, extremely stony complex, stream breaklands; volcanic ash over colluvium derived from quartzite	B	A- 4 (A- 1) fair to good sub-grade rating	2- 40	NR	Sanitation	yes	line	L	L	L			Bedrock and scree outcrops average 25- 30%. Where most road construction is proposed beds are tilted 40° inslope.
14JB	2	30- 50	Wickware family, dissected hills and alluvial fans; slope alluvium and/or lacustrine deposits, and slope alluvium derived from metasedimentary rock	C	A- 4 (A- 6)	0	NR	Sanitation	no	tractor & line	H	M	M			Fine/erodible soils on moderate to steep topography.
30Q C	2	15- 55	Mitten and Tevis families, moderately steep mountain slopes; volcanic ash over colluvium derived from metasedimentary rock	B	A- 4 (A- 1) fair to good sub-grade rating	0- 17	NR	Sanitation	yes	tractor & line	M	M	M			Bedrock outcrops common. Where most road construction is proposed beds are tilted -60° downslope.
60Q A	1	40- 50	Lostbasin family, extremely stony- Rock outcrop complex, stream breaklands; colluvium derived from quartzite	B	A- 1 (A- 6) excellent to poor sub-grade rating	12- 23	0.2	OSR	yes	tractor & line	M	L	M			Bedrock and scree outcrops average 25- 30%. Where road construction is proposed beds are tilted -34° downslope.
Hf2	<1	0- 15	Half Moon silt loam; silty/clayey/course-silty glaciolacustrine deposits	C	A- 4	3- 8	NR	OSR	no	tractor	M	M	M			Fine/erodible soils on flat topography.
13UA	<1	0- 40	Combest and Kadygulch families, high stream terraces and escarpments; volcanic ash over alluvium and/or slope alluvium and/or colluvium derived from metasedimentary rock	B/A	A- 1 (A- 2, A- 6)	0- 17	NR	Sanitation	no	tractor	L	L	L			Bedrock outcrops common.
Mx1	<1	0	McCaffery complex; coarse- silty/silty glaciolacustrine deposits, and sandy glaciofluvial deposits	B/A	A- 2 (A- 4)	0	NR	Sanitation	no	tractor	M	L	M			Fine/erodible soils on flat topography.
14XA	<1	15- 40	McCaffery family and Typic Haplustepts, dissected hills and alluvial fans; slope alluvium and/or lacustrine deposits	A/B	A- 2 (A- 6, A- 4)	0	NR	Sanitation	no	tractor & line	H	L	M			Fine/erodible soils on moderate slopes.
Hf1	<1	0	Half Moon silt loam; silty/clayey/course-silty glaciolacustrine deposits, volcanic ash over sandy and gravelly outwash	C	A- 4	3- 8	NR	OSR	no	tractor	M	M	M			Fine/erodible soils on flat topography.
64Q A	<1	45	Lostbasin- Bergquist families, complex, steep mountain slopes, very stony; colluvium derived from quartzite	B	A- 1 (A- 4)	7- 23	NR	Sanitation	no	line	L	L	L			10% rock outcrops
14JA	<1	0- 10	Stryker family, dissected hills and alluvial fans; slope alluvium and/or lacustrine deposits	C	A- 4 (A- 6)	0	NR	Sanitation	no	tractor	M	M	M			
Kr1	<1	0	Krause gravelly loam; volcanic ash over sandy and gravelly outwash/gravelly till, coarse- silty glaciolacustrine deposits, and sandy glaciofluvial deposits	B	A- 4	8	NR	OSR	no	tractor	L	L	L			Fine/erodible soils on flat topography.

Table S-2: Column definitions for Table S-1.

S-1 table column and label		Definition or explanation
A	Soil Map Unit	Soil map unit symbol assigned by NRCS.
B	Portion of direct analysis area (%)	Percent of direct analysis occurring within map unit.
C	Slopes (%)	Slopes occurring within the map unit within the direct analysis area determined from NRCS description or topographic measurements using digital map.
D	Soil Unit Description; & Parent Material	Soil unit description and parent material described by NRCS soil survey.
E	Hydrologic soil group	Based on estimates of runoff potential published by NRCS. Hydrologic soil group is components >20% of the soils. Dominant group type listed first. For example if a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for the most common class occurring in the area and the second is for the less common. <u>Group A.</u> Soils have a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission. <u>Group B.</u> Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission. <u>Group C.</u> Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils <u>Group D.</u> Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These
F	AASHTO classification; & interpretation	The AASHTO system classifies soils according to particle-size distribution, liquid limit, and plasticity index... properties that are relevant to soil performance in roadway construction and maintenance. The classification system has seven groups from A-1 to A-7. Soils in group A-1 are coarse grained and soils in group A-7 are fine grained.
G	Rock fragments (%)	Percent rock fragments is the range of representative values reported in the top 18 inches.
H	K_w	K_w values from Powell County soil survey (NRCS 2017) and indicate the erodibility of the whole soil. The estimates provided by the NRCS are modified by the NRCS to account for the presence of rock fragments which, if present, decrease the erodibility of the soil unit.
I	Timber Harvest	Description of proposed project activities occurring in the soil unit occurring in the direct analysis area.
J	Road construction	
K	Yarding method	
L	Erosion Risk	Assessed based on soil texture, permeability, parent material, slope, past and current disturbances, proximity to surface waters, and proposed activity and yarding method.
M	Compaction Risk	Assessed based on soil texture, parent material, slope, and proposed activity and yarding method.
N	Displacement Risk	Assessed based on slope and proposed activity and yarding method.
O	Other notes	Other notes from NRCS descriptions, geologic data, topographic data, or recent field observations.

Current and past disturbances (Current site use and site History)

Current and past disturbances in the project area include timber harvest, vegetation management, roads construction and maintenance, and recreational use. Known specifics on these past and current disturbances are listed below.

- Based on available timber sale records, two timber harvests have occurred within the project area in the past 20 years. The environmental effects were analyzed under the St. Regis Beetle EA and were located in Sections 16 and 20 of T18N R27W, together they treated approximately 570 acres and removed 2.8 MBF. The impacts of past operations are not readily visible on the ground. That is, a network of past skidding trails is not obvious except for some line corridors on the northern part of the project area from cable yarding that occurred around 2003.
- Recreational use of the project area includes hunting, hiking, and camping. Unpermitted use has included on and off-road vehicle, ATV, and snowmobile travel. The existing impact to soils associated with the road and trail generation from unauthorized off-road motorized travel on project parcels are extensive and described in further detail in the following section.
- Noxious weeds occurring within the project and surrounding areas include spotted knapweed and sulphur cinquefoil along roads, and isolated infestations of houndstongue and oxeye daisy.
- The project includes an active grazing license on State land that allows for grazing between June 1 and September 30 each year and expires in 2027.

- No recent or documented fire activity. Some scarring from the 1910 fires still visible on older pine trees in some areas.

Existing disturbances associated with unauthorized off-road motorized travel

The largest existing contributor of ongoing soil disturbance and erosion in the project area is from the existing network of road and trail surfaces resulting from unauthorized motorized travel in unroaded areas of the project, referred to hereafter as ATV trails. Although more miles of existing road infrastructure are present within the project area, these roads are mostly designed with BMPs and road surface drainage. Conversely, the ATV trails have created direct impacts to the soils within their footprint, and because of their lack of design and maintenance for adequate drainage and prevention of erosion and sedimentation, their impacts have propagated to areas beyond their footprint. The ATV trails are steep (50% in many areas) and without drainage design resulting in severe gullying that connect with ephemeral draws or downslope roads including the county road. This has resulted in the filling of drainage structures including ditches and culverts with sediment. It is reasonable to assume that during runoff events sediment mobilized from these areas could deliver to surface waters adjacent to the project area via ephemeral draws and county road drainage.

In the summer of 2019, we inventoried ATV trails that have resulted in the exposure of bare soil and the total estimated length is 2 miles. Assuming an average width of 6 feet, these trails have exposed soils on approximately 1.5 acres. This cumulative area is not large considering the 5,172 acre total project area.

These ATV trails connect open roads including the county road with restricted access roads therefore enabling unauthorized motorized access to restricted roads within the project area. These conditions are more thoroughly described and analyzed in the water resources section of this EA due to their implications for affecting erosion control on road infrastructure within the project area.

Environmental Effects

Summary of proposed activities and project design elements that avoid or minimize impacts to water quantity and quality or address impacts associated with the existing condition.

Below is a list of project elements that should reduce the potential impacts of the project on water quantity and quality. Some of these project elements can be considered mitigation.

- Applicable state plans, rules, and practices have guided project planning and/or would be implemented during project activities, including the Montana Habitat Conservation Plan (HCP), the Montana Code Annotated (specifically Title 77, Chapter 5), the Administrative Rules of Montana (specifically Rule Chapter 36.11), the Montana Forest Best Management Practices, the Montana Streamside Management Zone (SMZ) Law, and the State Forest Land Management Plan.
- Proposed harvest areas with steep slopes (slopes $\geq 45\%$) would be cable yarded which would limit soil disturbances as compared to ground-based yarding.
- Planned operations include the treatment of existing weeds and prevention of the introduction of weeds by including weed treatment in sale contracts, grass-seeding disturbed areas adjacent to roads and existing infestations and washing harvesting equipment.

Compliance with the Regulatory Framework section is assumed and accounted for in this analysis.

No Action Alternative: Direct, Secondary, and Cumulative Effects

No timber harvesting or associated activities would occur under this alternative. Skid trails, roads, and landings from past harvesting would continue to recover from compaction as freeze-thaw cycles continue and vegetation root mass increases. No additional adverse cumulative effects to soils would be expected from the implementation of the No-Action Alternative. Because harvesting would not be implemented, compaction, displacement, and hillslope erosion rates above existing levels would not be expected. Coarse woody debris levels and nutrient cycling would continue as dictated by natural events.

As is described in the Vegetation Analysis of this EA, noxious weeds would persist and may continue to spread with no action. Noxious weeds degrade water quality and increase soil erosion compared to sites where native grasses dominate (SFLMP, 1999).

Action Alternative: Direct, Secondary, and Cumulative Effects

The project involves timber harvest, road maintenance, and road construction. The effects associated with soil erosion on roads, road fill and cut slopes, and landings is analyzed mainly in the Water Resources Analysis section of this EA since the productivity of soils in these areas is less of a concern when compared to sedimentation risk to surface waters.

Soil productivity would be lost in areas directly affected by the proposed road construction. Approximately 13 miles of road and 7 miles of new spur road would be constructed, thereby directly affecting approximately 280 acres or 8 percent of the direct analysis area (see calculation in Table S-3). This area accounts for total footprint of the new road infrastructure, including the design average road width, pullouts, cutslopes, and roadfills.

Soil productivity would be maintained by implementing BMP's and mitigations to limit the area affected and rehabilitate skid trails where needed. All new roads would have drainage installed and maintained following use. The existing gate closure would be maintained and unauthorized ATV trails that circumvent road closures would be obliterated or obstructed as these trails are encountered by harvest operations. See further discussion in the mitigation section of this analysis.

Geology***Direct, Secondary, and Cumulative***

The geology would remain similar to those described in the existing conditions sections of this environmental assessment.

Physical Disturbance (Compaction and Displacement)***Direct and Secondary***

Ground-based yarding is the only soil compaction risk associated with the project (outside of roaded areas). The most important way soil compaction can be avoided is to not operate when soils are wet. This risk is addressed in the mitigations listed at the end of this analysis.

The extent of detrimental soil disturbance from ground-based yarding (by compaction and displacement) is expected to be similar to what is reported from monitoring similar past operations (12.2 percent, DNRC, 2011). The harvest of 1,593 acres using ground-based operations is proposed, which would be expected to have moderate or higher impacts on up to 194 acres.

Table S-3 – Detrimental Soil Disturbance for the Action Alternative

Area of Analysis	Total Area (Acres)	Disturbance Rate (%)	Affected Area (Acres)
Proposed Road Construction (temp/permanent)	63 acres (13 mi length of new road and assuming average 40-ft width disturbed)	100%	63
Temporary spur roads for cable yarding access	17 acres (7 mi length of new spur road and assuming average 20-ft width disturbed)	100%	17
Harvest units with ground-based yarding (including landings)	1,593 acres	12.2	194
Total detrimental disturbance in direct analysis area is 274 acres or 8%			

Cumulative

Cumulative effects would be controlled by limiting the area of adverse soil impacts to less than 15 percent of ground-based harvest units (as recommended by the SFLMP) through implementation of BMPs, skid trail planning, and limiting operations to dry, over snow, or frozen conditions (see Mitigation Section of this analysis). Harvest units that would be cable-yarded are expected to not have adverse soil impacts. The proposed harvesting activities would rely on the existing road system, skid trails (where appropriate), and landing sites to reduce the area of new direct adverse effects. A larger area, not to exceed 40% (and likely less), would be directly physically disturbed if scarification by dispersed skidding is deemed necessary for germination of desired tree species (e.g., western larch). This would increase the area of direct effects by physical disturbance, but the risk of moderate or high cumulative impacts would be low with adherence to mitigation listed in the following section.

Erosion**Direct, Secondary, and Cumulative**

Hillslope erosion would potentially result from the harvest of trees, yarding, and skid trail development associated with the project. The magnitude, area, and duration of erosion and other adverse impacts such as compaction and displacement would be lowered by BMPs and mitigations (refer to the following Mitigations Section of this analysis). Therefore, the risk of unacceptable adverse direct, indirect, or cumulative impacts would be low.

Nutrient Cycling and Soil Productivity**Direct, Secondary, and Cumulative**

Coarse woody debris would be left on-site in volumes recommended to help maintain or improve soil moisture and forest productivity. The dominant habitat types within the project area are Douglas-fir/ninebark (DF/PHMA) and Grand fir/beargrass (GF/XETE); these habitat types would have an optimal CWD concentration ranging between 4.5 to 14 tons per acre (Graham et al., 1994). Tree limbs/tops would be left on site in amounts that are feasible and meet the optimal CWD concentrations listed here and in the mitigation section at the end of this analysis. It is expected that the concentrations of CWD in the harvest areas would increase with the project over the existing condition. Fine debris removal would be also minimized as much as practicable. Given these measures and the mitigation described below, the risk of measurable adverse direct, secondary, or cumulative impacts to nutrient cycling would be low.

Slope Stability**Direct, Secondary, and Cumulative**

Slopes in the project area are considered stable with low to no vulnerability to mass wasting should the proposed project be implemented. This is mainly attributed to the high rock content and shallow soil mantles in the project area and the limited operations on slopes $\leq 45\%$. Project design includes road construction and improving road drainage on existing roads which would reduce the risk of slope and fill wasting. Most wheeled and tracked equipment operations would occur on slopes $\leq 45\%$. Therefore, we conclude there would be no risk of direct, secondary, or cumulative effects to slope stability as a result of the proposed project.

Mitigations

Below is a list of additional mitigations that would be included in any implementation of the Action Alternative in order to reduce the potential impacts of the project on soil resources. These mitigations are assumed in this soils resource analysis. Some mitigations are project-specific, and others are general common practice or are commitments made by the DNRC such as the SFLMP and the HCP.

- To prevent soil compaction ground-based mechanical felling and yarding would be restricted to one or more of the following conditions:
 - Soil moisture content at 4-inch depth less than 20% oven-dry weight.
 - Minimum frost depth of 4 inches.
 - Minimum snow depth of 18 inches of loose snow or 12 inches packed snow.
- For each individual sale the logger and the Forest Officer would agree to a general hauling, landing, and skidding plan prior to equipment operations to meet the following objectives:
 - Limit trails to existing skid trail disturbances as much as possible to minimize new disturbances.
 - Limit ground-based equipment operations on slopes greater than 45%, except for short pitches.
- Slash would be distributed within harvest units, including large (≥ 3 -inch diameter) and fine material (such as branches and leafy material), to maintain or achieve the amount of coarse woody material appropriate to the dominant habitat type within the project area:
 - Douglas-fir/ninebark (DF/PHMA) is **4.5 to 9 tons per acre** (Graham et al., 1994)
 - Grand fir/beargrass (GF/XETE) is **7 to 14 tons per acre** (Graham et al., 1994)
- Skid trails and landings would be treated with slash, water bars, and grass seed to reduce the risk of the concentration of water and impede overland flow and consequent erosion, to reduce soil detachment by raindrop impact, discourage the recruitment and establishment of weeds on disturbed soils.
- Roads and trails resulting from unauthorized motorized travel (unauthorized ATV trails) within the project area would be reclaimed and obstructed from further motorized use as equipment access allows. This work would occur as harvest and road work progresses to areas adjacent to unauthorized ATV trails. The work could include the following or other possible methods as deemed feasible and effective by the forest officer and equipment operator: Kelly humps, fencing, signs, scarification, and heavy slashing. Routine inspection and photo monitoring and coordination with local and agency law enforcement may also be employed to discourage and enforce State Trust Land Access rules and laws. This would reduce the risk of the expansion of the existing unauthorized ATV trail network following vegetation removal associated with the proposed project.
- Scarification by dispersed skidding would be limited to the following conditions:
 - Slopes less than 40%
 - Cumulative area of direct disturbance, when combined with ground-based yarding disturbances, would not exceed 40%.

- Where there is an identified need for mineral soil exposure for germination of desired species (such as western larch).
- Scarification depths not to exceed those necessary to achieve exposure of mineral soil and not more.

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Attachment D – Water Resources Analysis

Burr Saddle Project – Water Resources Analysis

Analysis Prepared By:

Name: Andrea Stanley

Title: Hydrologist/Soils Scientist, Montana DNRC

Introduction

The following analysis will disclose anticipated effects to water resources within the Burr Saddle project area. Direct, secondary, and cumulative effects to water resources of both the No-Action and Action alternatives are analyzed.

Issues and Measurement Criteria

Timber harvest, site preparation, road construction/maintenance, and vegetation management can alter local water quality and quantity. Water resource issues include the following:

- Quality
- Quantity

Evaluating for the above issues will address issues raised during project scoping. Water resource related comments received during scoping were limited to comments received in a phone conversation with the Montana Fish, Wildlife, and Parks (FWP). Which consisted to reference of the DNRC's Habitat Conservation Plan (HCP) if harvesting in the Stream Management Zone (SMZ) or Riparian Management Zone (RMZ) (FWP, phone communication 2016).

Regulatory Framework

The following plans, rules, and practices have guided project planning and/or would be implemented during project activities:

- The Montana Department of Natural Resources and Conservation (DNRC) Forested Trust Lands Habitat Conservation Plan (HCP; USFWS and DNRC 2010)
- The Montana Code Annotated, specifically Title 77, Chapter 5.
- The Administrative Rules of Montana, specifically Rule Chapter 36.11
- The Montana Forestry Best Management Practices (Voluntary, but considered as management requirement for State Lands)
- The Montana Streamside Management Zone Law
- The State Forest Land Management Plan (DNRC, 1996)
- The Stream Protection Act (SPA)

Analysis Areas

The Burr Saddle project area is within the Clark Fork watershed and spans several sub-watersheds listed below. Figure W-1 shows the analysis areas.

Sub-watershed (6 th level)	12-digit Hydrologic Unit Code	Analysis Area Description
Clark Fork River- Slowey Gulch	170102040706	The analysis area is reduced from the HUC to include only the area east of the Clark Fork. This analysis area is 6,290 acres and is drained by Mill Creek . This area is tributary to the Clark Fork.
Clark Fork River- Cold Creek	170102040704	The analysis area is reduced from the HUC to include only the area east of the Clark Fork and the tributary watersheds containing the project area. This analysis area is 4,430 acres and is drained by Fourmile Creek . This area is tributary to the Clark Fork.
Clark Fork River- SevenmileCreek	170102040707	The analysis area is reduced from the HUC to include only the area east of the Clark Fork and the tributary watersheds containing the project area. This analysis area is 540 acres. This area is tributary to the Clark Fork.

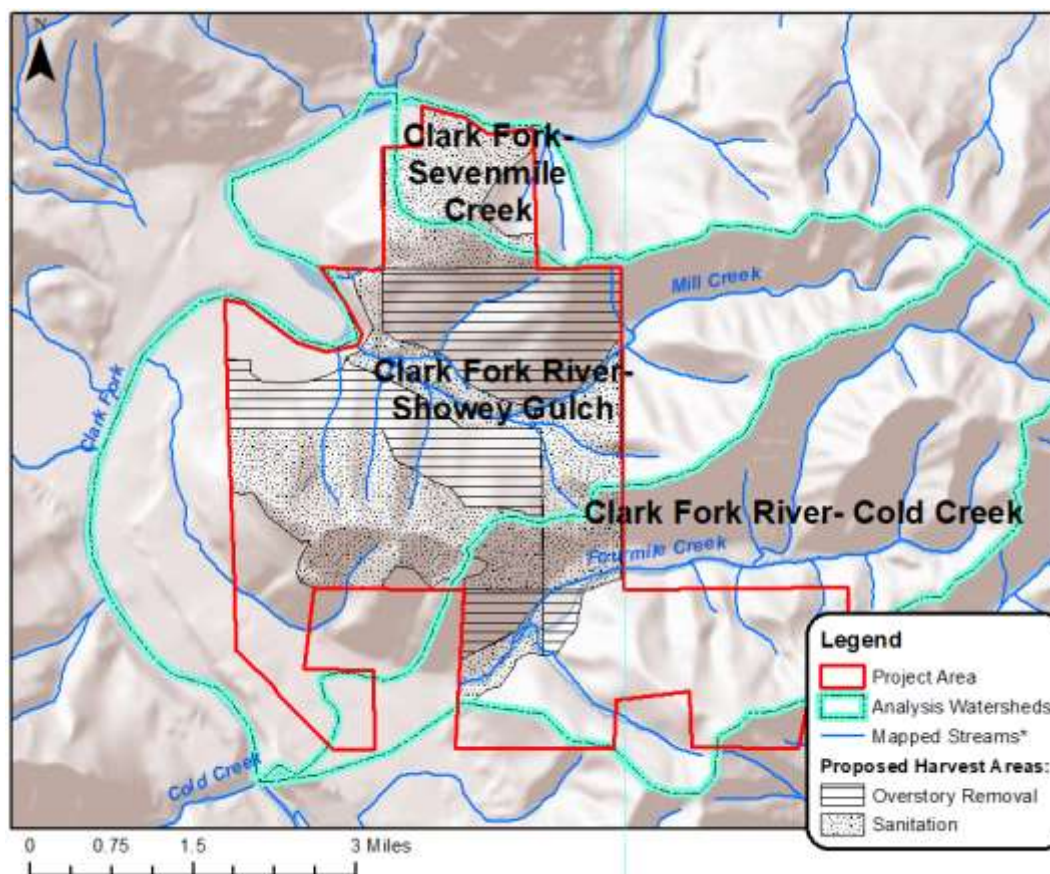


Figure W-1: Water resources analysis areas, mapped streams, and proposed vegetation harvest and treatment areas. (Mapped streams include original NHD-mapped, field-verified, and unverified locations.)

Analysis Methods

This assessment begins with a characterization and evaluation of the **existing conditions** within the assessment areas. This informs both potential site sensitivities to water quality and quantity impacts (e.g., listed beneficial uses) and the likely condition that would persist under the No Action Alternative. Below is a list of the data and analysis methods used for characterizing existing conditions:

- The Total Maximum Daily Load (TMDL) document and Watershed Restoration Plan for the Central Clark Fork Basin Tributaries.
- Past and current DRNC land and forest management data
- DNRC monitoring and grazing license data
- On-site observations including road infrastructure BMP monitoring, stream channel conditions, observations on geology, soils, slopes, historic road and skid trails, and streamside and wetland vegetation.

To evaluate the **potential water resource effects of the Action and No Action Alternatives** within the assessment areas we consider impacts typical to timber harvest, associated infrastructure and activities including roads, landings, vegetation/fuels management including slash treatment, and weed management.

Existing Conditions

Below is a summary of key water resource related site conditions and findings for the project area:

- The Clark Fork is the nearest classified stream to the project and is immediately downstream of the project area.
- The Clark Fork is classified as a B-1 stream. Which means it is suitable for drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.
- The project area includes roads and landings used in previous harvests and in land management and monitoring.
- Roads and stream crossings within the project area and along state-owned haul routes vary in age, condition, and compliance with BMP standards.

Below is a summary of the named surface waters within, downgradient, or downstream of the project area. Figure W-1 shows the analysis areas and **named** streams within the project area.

Mill Creek topographically contributes to the Clark Fork however a stream channel was not identified at the topographic low elevations within the Mill Creek drainage or at the banks of the Clark Fork. Water quality and beneficial uses have not been classified for Mill Creek.

Fourmile Creek also topographically contributes to the Clark Fork however a stream channel was not identified at the topographic low elevations within the Fourmile drainage within the project area except for an isolated area downstream of a water diversion pipeline vault with overflow. This isolated location is classified as a Class 3 stream and the location is southeast of the Fourmile Road and within sanitation harvest unit at

approximately 47.2825°N, 115.0325°W. Water quality and beneficial uses have not been classified for Fourmile Creek.

The Clark Fork is downstream of the project area and is classified as a B-1 stream (water quality category 4A) in the Central Clark Fork Planning Area. The river is listed for supporting drinking water and agricultural beneficial uses. The river is listed for not fully supporting primary contact recreation and aquatic life due to impairments attributed to mine and mill tailings and municipal point discharges.

Current and past disturbances (Current site use and site History)

Current and past disturbances in the project area include timber harvest, vegetation management, roads construction and maintenance, and recreational use. Known specifics on these past and current disturbances are listed below.

- Based on available timber sale records, two timber harvests have occurred within the project area within the past 20 years. The environmental effects were analyses under the St. Regis Beetle EA and were located in Sections 16 and 20 of T18N R27W, together they treated approximately 570 acres and removed 2.8 MBF.
- Recreational use of the project area includes hunting, hiking, and camping. Unpermitted use has included on and off-road vehicle, ATV, and snowmobile travel.
- Noxious weeds occurring within the project and surrounding areas include spotted knapweed and sulphur cinquefoil along roads, and isolated infestations of houndstongue and oxeye daisy.
- The project includes an active grazing license on State land that allows for grazing between June 1 and September 30 each year and expires in 2027.
- No recent or documented fire activity. Some scarring from the 1910 fires still visible on older pine trees in some areas.

Environmental Effects

Summary of proposed activities and project design elements that avoid or minimize impacts to water quantity and quality or address impacts associated with the existing condition.

Below is a list of project elements that reduce the potential impacts of the project on water quantity and quality. Some of these project elements can be considered mitigation.

- Applicable state plans, rules, and practices have guided project planning and/or would be implemented during project activities, including the Montana Habitat Conservation Plan (HCP), the Montana Code Annotated (specifically Title 77, Chapter 5), the Administrative Rules of Montana (specifically Rule Chapter 36.11), the Montana Forest Best Management Practices, the Montana Streamside Management Zone (SMZ) Law, and the State Forest Land Management Plan.
- Harvest boundaries only cross one stream (class 3) within the project area. Commercial harvest activities conducted near this stream would comply with the HCP. The HCP applies to the entire project area.

- Soil protection and mitigation measures listed in the soils analysis of this EA also protect water quality by avoiding and minimizing sedimentation risk. This includes, but is not limited to road drainage BMPs, CWD retention, and grass-seeding of disturbed areas such as skid trails, landings, and road prisms.
- The Forest Officer and/or DNRC Hydrologist would routinely inspect road closures, such as gates, barriers, and earth berms routinely during project implementation.

No Action Alternative: Direct, Secondary, and Cumulative Effects**Water Quality*****Direct and Secondary***

Under this alternative, no timber harvesting or related activities would occur. Water Quality would continue as described in the existing conditions.

Cumulative

No additional cumulative impacts to water quality would be expected. Sediment delivery sites from roads on the proposed haul routes would remain unchanged, as would the sediment sources described in Existing Conditions.

Water Quantity***Direct and Secondary***

No increased risk of increases or reductions in annual water yield would result from this alternative.

Cumulative

No increase in water yield would be associated with this alternative. As vegetation continues toward a fully forested condition, annual water yields would also be expected to gradually decline.

Action Alternative: Direct, Secondary, and Cumulative Effects**Water Quality*****Direct and Secondary***

With implementation of all applicable BMPs the risk of direct or secondary water quality impacts would be low. Water quality is expected to continue as described in the existing conditions.

Cumulative

The cumulative effects of the project on water quality within and downstream of the project are expected to be undetectable.

Water Quantity***Direct and Secondary***

Local evapotranspiration and precipitation interception rates would decrease in the short term with the removal of vegetation associated with the timber harvest. However, the increased water availability is expected to increase growth of remaining trees and the establishment of new trees following the harvest are expected to gradually increase water consumption with growth.

Studies correlating vegetation harvest and treatment with streamflow yield have suggested approximately 15-20% of the watershed cover must be harvested to have a measurable increase in water yield in similar mountain environments (Stednick, 1996; and Bosch and Hewlett, 1982). Below is a summary of estimated percent vegetation removal by treatment type proposed with this project.

Cutting treatment type	Treatment	Percent Vegetation Removed*
Even-aged Regeneration	Overstory Removal	60%
Special Situation	Sanitation Harvest	60%

*Percent vegetation removed from within the treatment acres estimated from projected basal area that would be cut or estimated canopy cover that would be removed. These numbers are intended to be conservative; that is, the maximum potential removal is reported here, but the percent vegetation removal may be less.

Approximately 39% of existing vegetation would be removed above Mill Creek. Soils in the Mill Creek watershed have a moderate to high infiltration rate and therefore there is moderate potential for a measurable increase in water yield in Mill Creek as a result of the project.

In the northern portion of the project area approximately 39% of the vegetation within an unnamed draw within the Sevenmile Creek HUC would be harvested. No streams were identified in this area during field review in August 2019. And the nearest surface water is the Clark Fork. Therefore, although potentially 39% of the sub-watershed vegetation would be removed, the effect on streamflow is not expected to be measurable.

The proportion of vegetation removed above Fourmile Creek is 7% and would likely not yield a measurable change in water yield.

Table W-1 – Estimated vegetation removal by watershed for the action alternative

Watershed	Feature	Percent vegetation removed above feature	Percent vegetation removed from watershed
Clark Fork River- Cold Creek Clark Fork River- Slowey Gulch	Mill Creek	39%	24%
Clark Fork River- Sevenmile Creek Clark Fork River- Cold Creek	Fourmile Creek	7%	7%
Clark Fork River- Slowey Gulch	None	N/A	36%

As is described in the existing conditions of this analysis most water features mapped within the project area by the National Hydrologic Dataset and USGS Topographic Maps do not meet the definition of a stream as defined by MCA 77-5-302(7). However, with the removal of vegetation and sufficient climate conditions, these features may produce surface flow and scour sufficient to change their condition and meet the definition of a stream. This change would not necessarily be adverse, because an assumption can be made that these features were mapped based on a natural historic condition when vegetation densities and/or climatic conditions were varied enough over the existing condition to produce sufficient surface flow for a stream; and the project or post-project presence of a streams due to increases in water yield could therefore potentially remain within a natural spectrum of stream conditions observed historically.

Cumulative

The cumulative effects of the proposed project would be less than the anticipated local direct and secondary effects and would therefore be low risk and expected to not be detectable.

Mitigations

Below is a list of additional mitigations that would be included in any implementation of the Action Alternative in order to reduce the potential impacts of the project on water resources.

- Drainage improvement and maintenance work would be completed on existing roads within state lands and on the haul route between the project area and the nearest county road. The Project Manager would complete a road log for location and design of drainage improvements on existing roads and for the installation of the proposed new roads.
- Ephemeral draw bottoms would be monitored during harvest operations to watch for a changing condition that would constitute the presence of a stream meeting the definitions of a stream as defined by MCA 77-5-302(7). If a stream is observed, all harvest and equipment operations would be adjusted to comply with SMZ, HCP, ARM, and SFLMP requirements. This applies especially to the mapped alignments of Mill and Fourmile Creeks shown in Figure W-1.
- The Forest Officer, DNRC Hydrologist, and other DNRC staff would work to apply resources strategically and coordinate with local law enforcement to eliminate or reduce the unauthorized motorized access to DNRC trust lands occurring in the area. Actions would include repairing fencing, obstructing and potentially obliterating existing unauthorized roads and trails, signs, and monitoring. These actions may be limited based on availability of staff and funding resources. This work may also be phased as commercial harvest and route work progresses through the project area. **Priority obliteration and drainage improvement work would be where these unauthorized trails intersect open road infrastructure and ephemeral draws.**

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Attachment E – Wildlife Analysis

Burr Saddle – Wildlife Analysis

Analysis Prepared By:

Name: Garrett Schairer

Title: Wildlife Biologist, Montana DNRC

Introduction

The following sections disclose the anticipated direct, indirect, and cumulative effects to wildlife resources from the proposed action in the project area and cumulative-effects analysis areas described for each resource category. Past and ongoing activities on all ownerships, as well as planned future agency actions, have been taken into account in each cumulative-effects analysis for each resource topic.

Issues

Proposed activities could alter mature forested habitats and/or landscape connectivity, which could affect species that rely on these mature forested habitats, and/or alter connectivity and the ability of wildlife requiring corridors to move through the landscape.

Proposed activities could alter cover, reduce secure areas, and increase access, which could affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.

Proposed activities could negatively affect Canada lynx by altering lynx winter foraging habitat, summer foraging habitat, and other suitable habitat, rendering these habitats unsuitable for supporting lynx.

Proposed activities could negatively affect bald eagles by reducing nesting and perching structures and/or disturbing nesting bald eagles

Proposed activities could reduce the amount and/or quality of fisher habitats, which could alter fisher use of the area.

Proposed activities may alter flammulated owl habitat by reducing canopy closure and increasing tree spacing, while potentially removing snags needed by flammulated owls for nesting.

Proposed activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.

Proposed activities could reduce suitable nesting and foraging habitat for pileated woodpeckers, which could alter pileated woodpecker use of the area.

Proposed activities could remove forest cover on big game winter range, which could reduce the carrying capacity of the winter range

Proposed activities could remove big game security cover, which could affect hunter opportunity and local quality of recreational hunting.

Regulatory Framework

Various legal documents dictate or recommend management direction for terrestrial wildlife species and their habitats on state trust lands. The documents most pertinent to this project include DNRC Forest Management Rules, the Endangered Species Act, the Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act.

Analysis Areas

The discussions of existing conditions and environmental effects within each subsection pertain to land areas of 2 different scales. The first scale of analysis is the Project Area (5,172 acres), which includes DNRC-managed lands in sections 16, 20, 21, 22, 27, 28, 29, 32, 33, 34, and 35. The second scale is the cumulative-effects analysis area, which refers to a broader surrounding landscape useful for assessing cumulative effects to wildlife and habitat. For this proposed project, two distinct cumulative-effects analysis areas were identified. The first cumulative effects analysis area includes the project area and those lands within 1 mile of the project area (16,992 acres). This area includes 6,766 acres (40%) that are managed by DNRC, 3,983 acres (23%) that are privately-owned, 6,233 acres (37%) that are managed by US Forest Service. The second cumulative effects analysis area is approximately 31,308 acres and includes the area north, east, and south of the Clark Fork River, and bounded by Keystone Creek through Keystone Peak and back to the Clark Fork River. This cumulative-effects analysis area contains sizeable areas managed by US Forest Service (19,398 acres, 62%), DNRC (7,572 acres, 24%), and in private ownership (4,338 acres, 14%).

Analysis Methods

Analysis methods are based on DNRC State Forest Land Management Rules, which are designed to promote biodiversity. The primary basis for this analysis includes information obtained by: field visits, review of scientific literature, Montana Natural Heritage Program (MNHP) data queries, DNRC Stand Level Inventory (SLI) data analysis, aerial photograph analysis, and consultation with other professionals.

In the fine-filter analysis, individual species of concern are evaluated. These species include wildlife species federally listed under the Endangered Species Act, species listed as sensitive by DNRC, and species managed as big game by the Montana Dept. of Fish Wildlife and Parks (DFWP).

Coarse Filter Wildlife Analysis

Issue

Proposed activities could alter mature forested habitats and/or landscape connectivity, which could affect species that rely on these mature forested habitats, and/or alter connectivity and the ability of wildlife requiring corridors to move through the landscape.

Introduction

A variety of wildlife species rely on mature to old stands for some or all life requirements. Mature forests, generally characterized by abundant large diameter trees and dense canopy cover, play an important role in

providing food, shelter, breeding sites, resting areas, and/or travel corridors for certain animals. Wildlife use of older, mature forests is species-specific; some species use this habitat exclusively, other species only temporarily or seasonally, and some species avoid mature forests altogether. Several species known to be strongly associated with mature and old forests include American marten (*Martes americana*), northern goshawk (*Accipiter gentilis*), and winter wrens (*Troglodytes troglodytes*).

Forested landscapes in the western United States were historically shaped by natural disturbance events; primarily wildfire, blowdown, and pest outbreaks. Resulting broad landscape patterns were a mosaic of forest patches varying in age, composition and development. Timber harvest, like stand-replacement fire and blowdown, is a disturbance event that can create open, non-forested patches that over time develop into young, conifer forests. Patch size, age, shape, abundance, and distance to similar patches (connectivity) can be factors influencing wildlife use. The way through which patch characteristics influence wildlife use and distribution are dependent upon the particular species and its habitat requirements. Temporary non-forested openings, patches, and forest edges created by timber harvest and associated roads may be avoided by certain wildlife species adapted to mature, well-stocked forest. In contrast, other wildlife species flourish in early seral habitats created by disturbance. Connectivity under historical fire regimes within forest types found in the vicinity of the project area was likely relatively high as fire differentially burned various habitats across the landscape (Fischer and Bradley 1987).

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 5,172-acre project area. Cumulative effects were analyzed on a 31,308-acre area described above in the Analysis Areas portion of this analysis. This scale of analysis would be large enough to support a diversity of species that use mature forested habitats and/or require connected forested habitats.

Affected Environment

The project area currently contains approximately 4,034 acres (78% of project area) of mature stands (100-plus years in age) of ponderosa pine, Douglas-fir, western larch, Douglas-fir/western larch, and mixed conifer stands that have a reasonably closed canopy. Currently, forested areas cover most of the project area, facilitating some use by those species requiring connected-forested conditions and/or forested-interior habitats. Ongoing tree mortality within the project area is altering existing forested cover, forested-interior habitats, and landscape connectivity.

Roughly 5,142 acres of mature stands of Douglas-fir, Douglas-fir/western larch, and ponderosa pine exist on DNRC-managed lands within the cumulative effects analysis area. A portion of the 14,299 acres (60% non-DNRC lands) of forested habitats and some of the 6,657 acres (28% non-DNRC lands) of moderately stocked forested stands on other ownerships in the cumulative effects analysis area are likely also providing habitat for those species requiring mature, forested habitats and/or forested connectivity. Conversely, much of the 2,873 acres (12% of non-DNRC lands) of burned areas, shrubs, herbaceous areas, poorly stocked forested stands, and recently harvested stands on other ownerships in the cumulative effects analysis area is likely too open to be useful for these species requiring forested habitats. Ongoing tree mortality within the cumulative effects analysis area is altering existing forested cover, forested-interior habitats, and landscape connectivity. Past timber management (including DNRC's Fourmile Timber Sale Project), human developments, roads, and the natural openness of certain habitats in the cumulative effects analysis area has influenced landscape-level connectivity in the cumulative effects analysis area. Any ongoing timber management in the cumulative effects analysis area could continue to alter forested habitats and landscape connectivity.

Environmental Effects- Mature Forested Habitats and Landscape Connectivity**No Action Alternative: Direct and Indirect Effects**

No appreciable changes to existing stands would be anticipated. Stands providing forested cover that may be functioning as corridors, including riparian areas, saddles, and ridgelines, would not be altered. Continued tree mortality would further alter existing forested cover, forested-interior habitats, and landscape connectivity. No changes in human developments, motorized access, or visual screening would occur. No changes in wildlife use would be expected. Thus, no direct or indirect effects to mature forested habitats and landscape connectivity would be expected since: 1) no further changes to existing stands would occur; 2) no changes to human developments, motorized access, or visual screening would occur, and 3) no alterations to existing corridors would be anticipated.

No Action Alternative: Cumulative Effects

No appreciable changes to existing stands would be anticipated. Stands providing forested cover that may be functioning as corridors, including riparian areas, saddles, and ridgelines, would not be altered. Ongoing tree mortality within the cumulative effects analysis area is altering existing forested cover, forested-interior habitats, and landscape connectivity. Past harvesting has reduced the amount of mature, forested habitats in a portion of the cumulative effects analysis area; however, continued successional advances across the cumulative effects analysis area are moving stands toward mature forests. This alternative would not further reduce the amount of mature forested stands in the cumulative-effects analysis area. No changes in human developments, motorized access, or visual screening would occur. No changes in wildlife use would be expected. Thus, no cumulative effects to mature forested habitats and landscape connectivity would be expected since: 1) no further changes to existing stands would occur; 2) no changes to human developments, motorized access, or visual screening would occur; and 3) no alterations to existing corridors would be anticipated.

Action Alternative: Direct and Indirect Effects

Approximately 2,785 acres (54%) of existing mature Douglas-fir, western larch, western larch/Douglas-fir, ponderosa pine, and mixed conifer stands with a reasonably closed canopy would be harvested. In general, habitats for those species adapted to more-open forest conditions would increase in the project area, meanwhile habitats for wildlife species that prefer dense, mature forest conditions would be reduced in the project area. Although proposed harvesting and thinning on 3,299 acres (64% of the project area) would create more open stands that may be less suitable for wildlife species that use mature stands to move through the landscape, corridors would be retained, including a heavier retention corridor designed to facilitate connectivity and potential movements through the Mill Creek drainage towards Burr Saddle. Proposed pre-commercial thinning and any planting would improve the development of future mature forested stands in those areas treated. No changes in legal motorized public access would occur in the project area. Additionally, the only permanent human developments that would occur would be the construction of roughly 13 miles of restricted roads in the project area. Contract stipulations would minimize the presence of human-related attractants for the duration of the proposed activities. Some changes in visual screening would occur within individual units, but the combination of irregular-shaped units, topography, un-harvested patches throughout the project area, and distance from open roads would minimize the effects of the reductions in visual screening. Thus, a minor risk of adverse direct and indirect effects to mature forested habitats and landscape connectivity would be expected since: 1) proposed activities could reduce forested cover in a sizeable portion of the project area (64%), but a couple of corridors would be retained; 2) increased human developments in the form of restricted

roads, could concentrate human activity, but no changes in human-related attractants would occur; 3) no changes to legal motorized public access would occur, but increases in non-motorized access could facilitate increased human use of the project area; and 4) visual screening in portions of the project area would be reduced, but some visual screening would be retained across the project area.

Action Alternative: Cumulative Effects

Modifications to mature, forested habitats associated with this alternative would be additive to losses associated with past harvesting activities in the cumulative effects analysis area as well as ongoing activities in the cumulative effects analysis area. Across the cumulative effects analysis area, a variety of stands are providing for wildlife movements. Proposed construction of roughly 13 miles of restricted roads behind existing gates would be the only permanent human developments that would occur. No changes in the presence of human-related attractants would occur. No changes to legal motorized public access to the cumulative effects analysis area would occur. Minor reductions in visual screening in a small portion of the cumulative effects analysis area would be anticipated. Thus, a minor risk of adverse cumulative effects to mature forested habitats and landscape connectivity would be expected since: 1) proposed activities could reduce forested cover in a small portion of the cumulative effects analysis area, but corridors would exist; 2) minor increases in human developments that could concentrate human activities would occur, but no changes in human-related attractants would occur; 3) no changes to motorized public access would occur; and 4) visual screening in a small portion of the cumulative effects analysis area would be reduced, but considerable visual screening would persist across the cumulative effects analysis area.

Fine Filter Wildlife Analysis

In the fine-filter analysis, individual species of concern are evaluated. These species include those listed as threatened or endangered under the Endangered Species Act of 1973, species listed as sensitive by DNRC, and animals managed as big game by Montana DFWP. Table WI-1 – Fine Filter provides an analysis of the anticipated effects for each species.

Table WI-1 –Anticipated Effects of the Burr Saddle Project on wildlife species

Species/Habitat	Potential for Impacts and Rationale [Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below) L = Low Potential for Effects
Threatened and Endangered Species	
Grizzly bear <i>(Ursus arctos)</i> Habitat: Recovery areas, security from human activity	[Y] Detailed analysis provided below.
Canada lynx <i>(Felix lynx)</i>	[Y] Detailed analysis provided below.

Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zone	
Yellow-Billed Cuckoo <i>(Coccyzus americanus)</i> Habitat: Deciduous forest stands of 25 acres or more with dense understories and in Montana these areas are generally found in large river bottoms	[N] No suitable deciduous riparian habitats are in the project area. Thus, no direct, indirect, or cumulative effects to yellow-billed cuckoos would be expected to occur as a result of either alternative.
Sensitive Species	
Bald eagle <i>(Haliaeetus leucocephalus)</i> Habitat: Late-successional forest less than 1 mile from open water	[Y] Detailed analysis provided below.
Black-backed woodpecker <i>(Picoides arcticus)</i> Habitat: Mature to old burned or beetle-infested forest	[N] No preferred, recently (less than 5 years) burned areas are in the project area. Thus, no direct, indirect, or cumulative effects to black-backed woodpeckers would be expected to occur as a result of either alternative.
Coeur d'Alene salamander <i>(Plethodon idahoensis)</i> Habitat: Waterfall spray zones, talus near cascading streams	[N] No moist talus or streamside talus habitat occurs in the project area. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative.
Columbian sharp-tailed grouse <i>(Tympanuchus Phasianellus columbianus)</i> Habitat: Grassland, shrubland, riparian, agriculture	[N] No suitable grassland communities occur in the project area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative.
Common loon <i>(Gavia immer)</i> Habitat: Cold mountain lakes, nest in emergent vegetation	[N] No suitable lakes occur in the project area. Thus no direct, indirect, or cumulative effects to common loons would be expected under either alternative.
Fisher <i>(Pekania pennanti)</i> Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian	[Y] Detailed analysis provided below.
Flammulated owl <i>(Otus flammeolus)</i>	[Y] Detailed analysis provided below.

Habitat: Late-successional ponderosa pine and Douglas-fir forest	
Gray Wolf <i>(Canis lupus)</i> Habitat: Ample big game populations, security from human activities	[Y] Detailed analysis provided below.
Harlequin duck <i>(Histrionicus histrionicus)</i> Habitat: White-water streams, boulder and cobble substrates	[N] No suitable high-gradient stream or river habitats occur in the project area. No direct, indirect or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.
Mountain plover <i>(Charadrius montanus)</i> Habitat: short-grass prairie, alkaline flats, prairie dog towns	[N] No prairie dog colonies or other shortgrass prairie habitats occur in the project area. Thus, no direct, indirect, or cumulative effects to mountain plovers would be anticipated to occur as a result of either alternative.
Northern bog lemming <i>(Synaptomys borealis)</i> Habitat: Sphagnum meadows, bogs, fens with thick moss mats	[N] No suitable sphagnum bogs or fens occur in the project area. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.
Peregrine falcon <i>(Falco peregrinus)</i> Habitat: Cliff features near open foraging areas and/or wetlands	[N] No preferred cliffs or suitable rock outcrops suitable for use by peregrine falcons occur on, or within 1 mile of the proposed project area. Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.
Pileated woodpecker <i>(Dryocopus pileatus)</i> Habitat: Late-successional ponderosa pine and larch-fir forest	[Y] Detailed analysis provided below.
Townsend's big-eared bat <i>(Plecotus townsendii)</i> Habitat: Caves, caverns, old mines	[N] No suitable caves or mine tunnels are known to occur in the project area or vicinity. Thus, no direct, indirect or cumulative effects to Townsend's big-eared bats would be anticipated as a result of either alternative.
Wolverine <i>(Gulo gulo)</i> Habitat: Alpine tundra and high-elevation boreal and coniferous forests that maintain deep persistent snow into late spring	[N] Generally wolverines are found in sparsely inhabited remote areas near treeline characterized by cool to cold temperatures year-round and rather deep and persistent snow well into the spring (Copeland et al. 2010). The availability and distribution of food is likely the primary factor in the large home range sizes of wolverines (Banci 1994). The project area is generally below the elevations where wolverines tend to be located. No areas of deep persistent spring snow occur in the project area. Individual animals could occasionally use lands in the project area while dispersing or

	possibly foraging, and they could be displaced by project-related disturbance if they are in the area during proposed activities. However, given their large home range sizes (~150 sq. mi. -- Hornocker and Hash 1981), and manner in which they use a broad range of forested and non-forested habitats, the proposed activities and alterations of forest vegetation on the project area would have negligible influence on wolverines. Thus, minimal direct, indirect or cumulative effects to wolverines would be anticipated.
Big Game Species	
Elk	[Y] Big game winter range exists in the project area. Potential big game security habitat exists in the project area - Detailed analysis provided below.
Moose	
Mule Deer	
White-tailed Deer	

Threatened and Endangered Species

GRIZZLY BEAR

Issue

Proposed activities could alter cover, reduce secure areas, and increase access, which could affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.

Introduction

Grizzly bears are native generalist omnivores that use a diversity of habitats found in western Montana. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. The search for food drives grizzly bear movements, with bears moving from low elevations in spring to higher elevations through the summer and early fall, as fruits ripen throughout the year. Primary threats to grizzly bears are related to human-bear conflicts, habituation to unnatural foods near high-risk areas, and long-term habitat loss associated with human development (Mace and Waller 1997). Forest-management activities may affect grizzly bears by altering cover and/or by increasing human access into secure areas by creating roads (Mace et al. 1997). These actions could lead to the displacement of grizzly bears from preferred areas and/or result in an increased risk of human-caused mortality by bringing humans and bears closer together and/or making bears more detectable, which can increase the risk of bears being illegally shot. Displacing bears from preferred areas may increase their energetic costs, which may, in turn, lower their ability to survive and/or reproduce successfully.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 5,172-acre project area. Cumulative effects were analyzed on a 31,308-acre area described above in the Analysis Areas portion of this analysis. This area approximates the home range size of a female grizzly bear.

Existing Environment

The project area is 14 miles south of the Northern Continental Divide Ecosystem grizzly bear recovery area, and 24 miles from the 'occupied' grizzly bear habitat as mapped by grizzly bear researchers and managers to

address increased sightings and encounters of grizzly bears in habitats outside of recovery zones (Wittinger et al. 2002). However, grizzly bears are increasingly being documented south of the recovery zone. Grizzly bears have been documented near the project area in the past and use of the project area could occur. Grizzly bears generally use different habitats relative to season, but the combination of habitat attributes in the project area supports grizzly bears throughout the non-denning period.

Managing human access is a major factor in management for grizzly bear habitat. There is a moderate amount of open roads (4.4 miles; 0.5 mi./sq. mi., simple linear calculation) in the project area. Some non-motorized access to the project area exists given the presence of the open roads, the level of access to higher terrain, and the 22.3 miles of restricted roads in the project area. Open road densities are relatively high in the cumulative effects analysis area (1.6 mi./sq. mi., simple linear calculation); the potential for disturbance to grizzly bears in the cumulative effects analysis area is also fairly high given this level of access. Hiding cover exists on roughly 3,325 acres (64%) in the project area. One 3,510-acre block of potential grizzly bear security habitats (≥ 0.3 miles from roads receiving motorized use and $\geq 2,500$ acres in size) exists in the project area and contributes to a larger, 13,879-acre block of potential security cover that extends beyond the project area.

Within the cumulative effects analysis area, roughly 4,928 acres of grizzly bear hiding cover exists on DNRC-managed lands. Grizzly bear hiding cover is likely present on some of the 14,299 acres (60% of non-DNRC lands) of forested stands across the cumulative effects analysis area on other ownerships. Within the cumulative effects analysis area, hiding cover is largely absent from the 2,873 acres (12% of non-DNRC lands) of shrubs, herbaceous, and non-forested habitats and is likely somewhat limited on the other 6,657 acres (28% of non-DNRC lands) of sparsely stocked and young forest habitats in the cumulative effects analysis area. The 3,510-acre block of potential grizzly bear security habitat exists in the project area and contributes to a 13,879-acre block of potential grizzly bear security habitat; this block of potential grizzly bear security habitats looks to extend beyond the boundaries of the cumulative effects analysis area as well. Timber harvesting (including DNRC's Fourmile Timber Sale Project) and human development that has occurred in the cumulative effects analysis area likely altered grizzly bear habitats and/or human disturbance levels. Any ongoing timber management in the cumulative effects analysis area could continue to alter potential grizzly bear habitats.

Environmental Effects- Grizzly Bears

No Action Alternative: Direct and Indirect Effects

No direct or indirect effects to grizzly bears would be anticipated since: 1) no further disturbance or displacement would be expected, 2) no further changes in hiding cover would occur, 3) security habitat would not be altered, 4) no changes in long-term open-road density would be anticipated, and 5) no changes in availability of unnatural bear foods or attractants would occur.

No Action Alternative: Cumulative Effects

No appreciable changes to existing habitats would be anticipated; advances in succession within those recently harvested stands could improve hiding cover and potentially foraging habitats for grizzly bears. Thus, no further adverse cumulative effects to grizzly bears would be anticipated since: 1) no further changes in human disturbance levels would be expected; 2) no changes to open road density would occur; 3) no further modifications to hiding cover would occur; 4) no changes to security habitat would be expected; and 5) no changes in availability of unnatural bear foods or attractants would occur.

Action Alternative: Direct and Indirect Effects

This alternative might affect grizzly bears directly through increased road traffic, noise, and human activity, and indirectly by altering the amount of hiding cover and forage resources in the project area. Activities in grizzly bear habitats reduce grizzly bear security, possibly resulting in increased stress and/or energy expenditure to endure the disturbance or to move from the area. These potential disturbances would only be present during proposed operations; therefore, the season of disturbance is important in addressing effects to grizzly bears. Proposed harvesting could occur during the denning period or the non-denning period. Proposed activities conducted in the denning period would not be expected to disturb grizzly bears; some disturbance to grizzly bears would be possible with proposed activities that may occur during the non-denning period. Overall, the proposed activities would occur in areas where low levels of grizzly bear use would be anticipated, but would occur during a time period when habitat availability would not be limited, thus minor potential for disturbance and displacement of grizzly bears would be anticipated.

Approximately 13 miles of new, restricted roads would be constructed with the proposed activities. No changes in open road density or motorized public access would be anticipated. Minor changes in non-motorized public access could occur, but all proposed roads that would be built are considerable distances behind existing gates, thus limiting increases in contact between humans and grizzly bears. Hiding cover, defined as vegetation that will hide 90 percent of a grizzly bear at a distance of 200 feet, would be reduced on most of the 1,757 acres (53%) of hiding cover proposed to receive treatments. Some hiding cover in the form of brush, shrubs, and sub-merchantable trees would persist in several of the units, albeit at a reduced level from the existing condition; hiding cover would increase through time as young trees and shrub regeneration proceeds over the next 5 to 10 years. Although hiding cover would be reduced, no appreciable changes to security habitat would occur given no changes in open roads would occur in the project area.

Any unnatural bear foods or attractants (such as garbage) would be kept in a bear resistant manner. Any added risk to grizzly bears associated with unnatural bear foods or attractants would be minimal. Thus, a minor risk of adverse direct or indirect effects to grizzly bears would be anticipated since: 1) minor disturbance and displacement would be possible; 2) hiding cover would be reduced in a portion of the project area, but would remain in portions of the project area, and would be expected to recover in the short-term; 3) habitats in potential security habitat would be modified, but no changes in the availability of security habitats would occur; 4) no changes to long-term open road density would be anticipated; and 5) negligible increases in the availability of unnatural bear foods or attractants would be anticipated.

Action Alternative: Cumulative Effects

The increased use of road systems during the proposed project could temporarily increase human disturbance to grizzly bears in a portion of the cumulative effects analysis area. Collectively, short-term (2-4 years) increases in human disturbance would be anticipated in the cumulative effects analysis area. Continued use of the cumulative effects analysis area by grizzly bears would be anticipated at levels similar to present. Hiding cover would be reduced on roughly 1,757 acres with the proposed treatments; any ongoing habitat modifications and associated disturbance would continue. No further changes to the hiding cover on other ownerships would be anticipated. Reductions in hiding cover would be additive to the reductions from past timber harvesting, ongoing harvesting, as well as more permanent land-cover changes in the cumulative effects analysis area. Changes in hiding cover could concentrate grizzly bear use, but would not be expected to alter level of use of the cumulative effects analysis area. Early successional stages of vegetation occurring in harvest units could provide additional foraging opportunities for grizzly bears. Quality of grizzly bear security

habitat would be reduced in short-term, but would persist through time. No changes in long-term open-road density would be anticipated. Thus, a minor risk of adverse cumulative effects to grizzly bears would be anticipated since: 1) increases in human disturbance levels in the short-term could occur in a small portion of the cumulative effects analysis area; 2) hiding cover would be removed in the short-term on 1,757 acres in the cumulative effects analysis area; 3) no changes in long-term open road density would occur, 4) quality of security habitats would be reduced, but would persist into the future; and 5) negligible increases in the availability of unnatural bear foods or attractants would be anticipated.

CANADA LYNX

Issue

Proposed activities could negatively affect Canada lynx by altering lynx winter foraging habitat, summer foraging habitat, and other suitable habitat, rendering these habitats unsuitable for supporting lynx.

Introduction

Canada lynx are associated with subalpine fir forests, generally between 4,000 to 7,000 feet in elevation in western Montana (Ruediger et al. 2000). Lynx in western Montana preferred mature, multi-storied stands with dense horizontal cover year-round; during the summer lynx also selected earlier successional stands with a high horizontal cover (Squires et al. 2010). For denning sites, the primary component appears to be abundant large woody debris, particularly in the form of downed logs, root wads, slash piles, and live trees (Squires et al. 2008). These conditions are found in a variety of climax vegetation habitat types, particularly within the subalpine fir series (Pfister et al. 1977). Historically, high intensity, stand-replacing fires of long fire intervals (150 to 300 years) occurred in continuous dense forests of lodgepole pine, subalpine fir, and Engelmann spruce. These fires created extensive even-aged patches of regenerating forest intermixed with old stands that maintained a mosaic of snowshoe hare and lynx habitat.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 5,172-acre project area. Cumulative effects were analyzed on a 31,308-acre area described above in the Analysis Areas portion of this analysis. The scale of this analysis area approximates the home range size of an individual lynx (Ruediger et al. 2000).

Existing Environment

The project area ranges from approximately 2,600 to 4,480 feet in elevation and is dominated by Douglas-fir, Douglas-fir/western larch, and ponderosa pine, with minor amounts of mixed conifer stands. Approximately 1,806 acres of lynx habitat occur in the project area (Table WI-2 – Canada lynx habitats and anticipated changes to existing lynx habitats under both alternatives of the Burr Saddle Project). Much of this habitat is winter foraging habitats with smaller amounts of other suitable habitats (largely forested lands that provide cover to facilitate movement) and temporary non-suitable habitats. Existing habitats are largely located on northerly-facing slopes and along drainage features, while being interspersed with unsuitable habitats of largely dry Douglas-fir and ponderosa pine on southerly facing slopes. Connectivity of forested habitats in the project area is fairly high, but those forested habitats are a mosaic of suitable types and unsuitable, drier ponderosa pine and Douglas-fir types on the south facing aspects. Generally, despite considerable potentially suitable lynx habitats existing in the project area, limited use by Canada lynx would be anticipated.

On DNRC-managed lands within the cumulative effects analysis area, roughly 2,051 acres of winter lynx foraging habitats exist, 33 acres of summer foraging habitats, 493 acres of other suitable habitats, and 129 acres of temporary non-suitable habitats. Similar to the project area, potentially suitable habitats on DNRC-managed lands (36% of DNRC-managed lands) in the cumulative effects analysis area are generally found on northerly-facing slopes and along drainage features and are interspersed with unsuitable, drier Douglas-fir and ponderosa pine types (64%), which likely limits the suitability of these habitats. On other ownerships, there are roughly 14,299 acres (60% of non-DNRC lands) of forested stands across the cumulative effects analysis area; a portion of those stands would likely be suitable lynx habitats and probably include some winter foraging habitats. Additionally, summer foraging habitats likely exists on a portion of the 6,657 acres (28% of non-DNRC lands) of sparsely stocked and young forest stands on other ownerships; no lynx habitats likely exist on the 2,873 acres (12% of non-DNRC lands) of shrubs, herbaceous, and non-forested types on other ownerships in the cumulative effects analysis area. Connectivity of lynx habitats within the cumulative effects analysis area is somewhat limited due to interspersed of suitable types with unsuitable, drier Douglas-fir and ponderosa pine types, ownership patterns, past timber management (including DNRC's Fourmile Timber Sale Project), human developments, agricultural fields, and the natural openness of certain habitats in the cumulative effects analysis area. Any ongoing timber management in the cumulative effects analysis area could continue to alter potential Canada lynx habitats. The general location on the landscape and proximity to habitat bisecting features such as the Clark Fork River, several highways, the town of St. Regis, and numerous other forms of human disturbance likely limits overall landscape connectivity and general usefulness of existing habitats within the cumulative effects analysis area for Canada lynx. Roughly 84.2% of habitats on DNRC-managed lands administered by the Southwestern Land Office under the HCP and outside of the Lynx Management Areas are in suitable lynx habitat categories.

Environmental Effects- Canada Lynx

No Action Alternative: Direct and Indirect Effects

In the short-term, no further changes in lynx habitat elements would be expected in the project area. Landscape connectivity would not be altered. Thus, a negligible risk of adverse direct and indirect effects to Canada lynx would be expected since: 1) existing winter foraging habitats would persist; 2) summer foraging habitats would continue to be a small component in the project area and would continue to disappear through time; 3) the amount of temporary non-suitable habitats would not change; and 4) landscape connectivity would not be altered.

No Action Alternative: Cumulative Effects

No appreciable change in lynx habitats in the cumulative effects analysis area would occur. No appreciable changes to landscape connectivity would be anticipated. Roughly 84% of habitats on DNRC-managed lands administered by the Southwestern Land Office under the HCP and outside of the Lynx Management Areas would be in suitable lynx habitat categories with this alternative. Thus, a negligible risk of adverse cumulative effects to lynx would be expected since: 1) winter foraging habitats would persist in the cumulative effects analysis area; 2) summer foraging habitats would persist in the near-term across the cumulative-effects analysis area, but longer-term availability of summer foraging habitats would likely decline without disturbance; 3) no changes in the amount of the cumulative-effects analysis area that is in the temporary non-suitable habitat class would occur; and 4) landscape connectivity would not be altered.

Action Alternative: Direct and Indirect Effects

Roughly half of the proposed activities would not occur in mapped lynx habitats (1,682 acres; 51% of proposed units) and would not be expected to appreciably affect lynx; approximately 1,608 acres of lynx habitats (89% of lynx habitats in the project area) could be altered with this alternative (Table WI-2 – Canada lynx habitats and anticipated changes to existing lynx habitats under both alternatives of the Burr Saddle Project). The proposed treatments in lynx habitats would be a combination of overstory removal, sanitation, and pre-commercial thinning. Proposed treatments would be expected to reduce winter foraging habitats by 1,422 acres and other suitable habitat category by 57 acres while increasing temporary non-suitable habitats by 1,479 acres. However, portions of these habitats could function as other suitable habitats depending on the density of trees retained, including portions of the 1,043 acres proposed for sanitation and those habitats including the heavier retention corridor designed to facilitate connectivity through the Mill Creek drainage towards Burr Saddle. Additionally, roughly 129 acres of temporary non-suitable habitats would be altered, but would continue to be temporary non-suitable habitats following proposed treatments. Thus, roughly 89% of the lynx habitats in the project area would be temporarily unsuitable for lynx following proposed treatments. Roughly 10% of the project area would be in foraging habitats and 1% would be in other suitable habitats following proposed treatments. The retention of patches of advanced regeneration of shade-tolerant trees, such as sub-alpine fir and Engelmann spruce in foraging habitats, would break-up sight distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx. Coarse woody debris would be retained (emphasizing retention of some logs 15 inches dbh and larger) to provide some horizontal cover and security structure for lynx. Within stands proposed for pre-commercial thinning in lynx habitats, small shade tolerant trees (such as sub-alpine fir and spruce) would be retained where possible to provide potential habitat structure for snowshoe hares by increasing the levels of horizontal cover and accelerating the development of multi-storied stands. In the short-term, lynx use of the project area could decline due to the openness in the project area. Proposed activities would further reduce forested connectivity in the area; some connectivity would be retained along riparian areas, through unharvested patches between harvested units, and by designing a heavier retention corridor in the Mill Creek drainage towards Burr Saddle. Collectively, a moderate risk of adverse direct and indirect effects to Canada lynx would be expected since: 1) the sizable amount of winter foraging habitats (89%) would be removed, with the majority of these habitats being converted to temporary non-suitable habitats following proposed treatments; 2) no summer would be immediately available following proposed treatments; 3) the amount of the project area in the temporary non-suitable lynx habitat category would increase to 89%; and 4) connectivity could be altered, but some connectivity would be maintained along riparian areas and through unharvested patches between units.

Table WI-2 –Acres of Canada lynx habitats and anticipated changes to existing lynx habitats under both alternatives of the Burr Saddle Project

Lynx Habitat Element	Exiting Condition and No-Action Alternative	Proposed Treatments		Action Alternative
		Overstory Removal	Sanitation	
Winter Foraging	1,605 (89%)	397	1,025	183 (10%)
Summer Foraging	0 (0%)	0	0	0 (0%)
Other Suitable	71 (4%)	39	18	14 (1%)
Temporary Non-Suitable	130 (7%)	103	26	1609 (89%)
Total Lynx Habitats	1,806			1,806
Non-Lynx Habitats	3,308	761	921	3,308

Action Alternative: Cumulative Effects

Within the cumulative-effects analysis area, roughly 1,608 acres of lynx habitats on DNRC-managed lands (59% of DNRC-managed lynx habitats) would be modified, with much of the modified habitats being converted into the temporary non-suitable habitat categories. Following proposed treatments, approximately 1,609 acres (59% of lynx habitats on DNRC-managed lands) would be in the temporary non-suitable habitat category following proposed treatments. The reductions in winter foraging (1,422 acres) and other suitable (57 acres) coupled with increases in temporary non-suitable habitats (1,479 acres) on a small portion of the cumulative effects analysis area could decrease the quality of the lynx habitats in the larger cumulative effects analysis area. Near-term increases in summer foraging habitats could occur with the proposed harvesting within a portion of the cumulative effects analysis area. Anticipated reductions in lynx habitats would be additive to past losses from timber harvesting and any ongoing modifications in the cumulative-effects analysis area. Likewise, increases in temporary non-suitable lynx habitats would be additive to habitats that have been recently converted due to timber harvesting. No appreciable changes to the suitable lynx habitats on other ownerships would be anticipated. Forest connectivity would be altered in the project area, but these reductions in connectivity would not appreciably alter connectivity in the cumulative effects analysis area. Connectivity of suitable lynx habitats along RMZs and the heavier retention corridor designed to facilitate connectivity and potential movements would be maintained and overall negligible changes to connectivity across the cumulative effects analysis area would be anticipated. Roughly 80.4% of habitats on DNRC-managed lands administered by the Southwestern Land Office under the HCP and outside of the Lynx Management Areas would be in suitable lynx habitat categories following proposed treatments. Thus, a moderate risk of adverse cumulative effects to Canada lynx would be expected since: 1) winter foraging habitats would persist; 2) summer foraging

habitats would continue developing for the next 10 to 30 years across the cumulative effects analysis area; 3) a moderate amount of lynx habitats would be in the temporary non-suitable habitat category; and 4) minor alterations in landscape connectivity would not prevent lynx movements.

Sensitive Species

BALD EAGLE

Issue

Proposed activities could negatively affect bald eagles by reducing nesting and perching structures and/or disturbing nesting bald eagles

Introduction

Bald eagles are diurnal raptors associated with significant bodies of water, such as rivers, lakes, and coastal zones. The bald eagle diet consists primarily of fish and waterfowl, but includes carrion, mammals, and items taken from other birds of prey. In Montana, bald eagles begin the breeding process with courtship behavior and nest building in early February; the young fledge by approximately mid-August, ending the breeding process. Preferred nest-stand characteristics include large emergent trees that are within sight distances of lakes and rivers and screened from disturbance by vegetation.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 5,172-acre project area. Cumulative effects were analyzed on the home range associated with the St. Regis bald eagle territory. This scale includes enough area for the nesting pair of bald eagles.

Existing Environment

Portions of the project area are within the home range associated with the St. Regis bald eagle territory. The pair using this territory has used several nests in the past, including one in the project area near the sewage lagoons, another across the river in the subdivision, and the current nest, also across the river from the project area. The pair appears to have used the current nest for the last 6 years and last used the nest in the project area in 2013. The aquatic habitats associated with this territory include Clark Fork River, St. Regis River, and numerous smaller streams, ponds, and wetlands. Aquatic and terrestrial prey species are fairly common in the home range. The terrestrial habitat incorporated by the territory is a coniferous/deciduous mixture along the lakeshores and riparian areas, with coniferous forests and grasslands in the upland areas. Within the home range, black cottonwood is the deciduous tree of primary importance to bald eagles, while large emergent conifers also provide important nesting, roosting, and perching habitats.

Human disturbance, including timber harvesting, agricultural activities, an active rail line, Interstate I-90, Highway 135, the town of St. Regis, many residential homes, and an active industrial timber mill are potential sources of disturbance to the nesting territory. Numerous large emergent trees are available across portions of the home range, but logging and other human developments in the last 100 years has likely reduced some of these attributes while others have experienced mortality and are declining in quality.

Environmental Effects-Bald Eagle**No Action Alternative: Direct and Indirect Effects**

No direct or indirect effects to bald eagles would be anticipated since: 1) no changes to human disturbance levels would occur; and 2) no changes in the availability of large, emergent trees suitable for perching or nesting would be expected.

No Action Alternative: Cumulative Effects

No cumulative effects to bald eagles would be anticipated since: 1) no changes to human disturbance levels would occur; and 2) no changes in the availability of large, emergent trees would be expected.

Action Alternative: Direct and Indirect Effects

No activities would occur in the nest area or primary use areas associated with the bald eagle territory. Proposed harvesting on 2,857 acres (87% of proposed units) would occur in the home range associated with the bald eagle territory. Proposed activities could occur when soils are dry, frozen, or snow covered. Thus, the proposed activities could occur during the bald eagle nesting season (February 1- August 15), or the non-nesting (August 16-February 1) season. Minor disturbance to bald eagles could occur for any activities that could be conducted during the nesting period in the home range. All proposed units would be more distant from the active nest site than the active timber mill, railroad, Highway 135, and numerous residences and other forms of human disturbance on the other side of the river, thus any additional disturbance would be expected to have negligible effects to the nesting pair should they occur during the nesting season. Conversely, no disturbance to bald eagles would be anticipated should those activities be conducted during the non-nesting period. Minor reductions in the availability of large snags or emergent trees that could be used as nest or perch trees could occur in the home range. No changes to human access to the home range would occur, thereby limiting potential for introducing additional human disturbance to the territory. Thus, a minor risk of direct and indirect effects to bald eagles would be anticipated since: 1) disturbance could be slightly elevated within the home range during operations, should they occur during the nesting period; 2) no appreciable change in human access within the project area would occur; and 3) minor reductions in the availability of large, emergent trees could occur in the home range.

Action Alternative: Cumulative Effects

Nesting bald eagles in this territory would continue to experience varying levels of disturbance. Any potential disturbance and/or noise from the proposed harvesting would be additive to any of these other forms of disturbance, however no changes in bald eagle behavior would be anticipated. Negligible reductions in emergent trees or snags could occur on a small portion of the home range. Thus, a negligible risk of cumulative effects to bald eagles would be anticipated since: 1) disturbance would be slightly elevated within the territory during harvesting operations; 2) no changes in human access within the territory would occur; and 3) negligible changes in the availability of large, emergent trees would be expected.

FISHER**Issue**

Proposed activities could reduce the amount and/or quality of fisher habitats, which could alter fisher use of the area.

Introduction

Fishers are a mid-sized forest carnivore whose prey includes small mammals such as voles, squirrels, snowshoe hares, and porcupines, as well as birds (Powell and Zielinski 1994). They also take advantage of carrion and seasonally available fruits and berries (Foresman 2012). Fishers use a variety of successional stages, but are disproportionately found in stands with dense canopies (Powell 1982, Johnson 1984, Jones 1991, Heinemeyer and Jones 1994) and avoid openings or young forested stands (Buskirk and Powell 1994, Weir and Corbould 2010). However, some use of openings may occur for short hunting forays or if sufficient overhead cover (shrubs or saplings) is present. Fishers appear to be highly selective of stands that contain resting and denning sites and tend to use areas within 150 feet of water (Jones 1991). Resting and denning sites are found in cavities of live trees and snags, downed logs, brush piles, mistletoe brooms, squirrel and raptor nests, and holes in the ground. Forest-management considerations for fisher involve providing for resting and denning habitats near riparian areas while maintaining travel corridors.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 5,172-acre project area. Cumulative effects were analyzed on the 31,308-acre cumulative effects analysis area described above in the Analysis Areas portion of this analysis. This scale includes enough area to approximate overlapping home ranges of male and female fishers (Heinemeyer and Jones 1994).

Existing Environment

There are approximately 1,877 acres (37%) of potential upland fisher habitats in the project area and 4 acres of riparian habitats associated with Class 2 streams in the project area. Additionally, there are 131 acres of upland preferred habitats that presently lack structural attributes that would facilitate use by fisher. Existing habitats are reasonably connected across portions of the project area, but are partially interspersed with unsuitable types. Existing habitats are partially connected throughout the cumulative effects analysis area, but timber management in the past and the interspersed of unsuitable habitat types has likely reduced overall suitability of the cumulative effects analysis area for fisher; some connectivity along riparian features in the cumulative effects analysis area exists. Within the cumulative effects analysis area, there are roughly 29,752 acres that would be classified as upland (more than 100 ft from Class 1 and more than 50 feet from Class 2 streams) and 1,555 acres that would be classified as riparian that are associated with the 93 miles of streams in the cumulative effects analysis area. On DNRC-managed lands, 99.6% of the potential riparian fisher habitats in the cumulative effects analysis area are providing structural habitat attributes that would facilitate use by fisher. Potential fisher habitats likely exist on a portion of the 14,299 acres (60% of non-DNRC lands) of forested stands that are below 6,000 feet in elevation across the cumulative effects analysis area, including roughly 890 acres that are in close proximity to streams in the cumulative effects analysis area. Within the cumulative effects analysis area, fisher habitats are largely absent from the 2,973 acres (12% of non-DNRC lands below 6,000 feet in elevation) of shrubs, herbaceous, and non-forested habitats and is likely fairly limited on the other 6,657 acres (28% of non-DNRC lands below 6,000 feet in elevation) of sparsely stocked and young forest habitats in the cumulative effects analysis area. Any ongoing timber management in the cumulative effects analysis area could continue to alter potential fisher habitats.

Environmental Effects-Fisher

No Action Alternative: Direct and Indirect Effects

No direct and indirect effects to fishers would be anticipated since: 1) no changes to existing habitats would be anticipated; 2) landscape connectivity would not be further altered; 3) no appreciable changes to snags, snag recruits, and coarse woody debris levels would be anticipated; and 4) no changes to public access or the potential for trapping mortality would be anticipated.

No Action Alternative: Cumulative Effects

No further cumulative effects to fishers would be anticipated since: 1) no further changes to existing habitats on DNRC-managed lands would occur; 2) any landscape connectivity afforded by the stands on DNRC-managed lands would not change appreciably; 3) no changes to snags, snag recruits, or coarse woody debris levels would be expected; and 4) no changes to public access or the potential for trapping mortality would be anticipated.

Action Alternative: Direct and Indirect Effects

No riparian habitats within 100 feet of class 1 streams or 50 feet of class 2 streams would be altered with the proposed activities. Approximately 1,188 of the 1,877 acres (63%) of upland fisher habitats in the project area would receive treatments that would reduce canopy closure and would likely be too open to be used by fisher; however portions of these acres are proposed to receive a sanitation treatment which could retain sufficient canopy closure to facilitate some limited use by fishers following proposed treatments. Proposed thinning and planting in fisher habitats would improve future fisher habitats by decreasing the time until those stands provide structural attributes needed by fisher. No changes in open roads would be anticipated. Trapping pressure and the potential for fisher mortality could remain similar to present levels. Minor reductions in landscape connectivity could occur with the proposed activities, but activities would avoid riparian areas commonly used by fisher. Additionally, a heavier retention corridor designed to facilitate connectivity and potential movements through the Mill Creek drainage towards Burr Saddle would be retained that could facilitate fisher use. Thus, a minor risk of adverse direct and indirect effects to fisher would be anticipated since: 1) harvesting would avoid riparian areas, but would modify upland fisher habitats; 2) minor reductions in landscape connectivity would occur, but those areas associated with riparian areas would remain unaffected; 3) harvesting would reduce snags and snag-recruitment trees while increasing coarse woody debris levels; however, some of these resources would be retained; and 4) no changes in legal motorized human-access levels would be anticipated.

Action Alternative: Cumulative Effects

Since no riparian habitats associated with Class 1 or 2 streams would be modified, no changes in the amount of the preferred riparian fisher cover types meeting structural requirements for fishers on DNRC-managed lands in the cumulative-effects analysis area would occur. Reductions in upland habitats on DNRC-managed lands (1,188 acres) would further reduce the amount of suitable upland fisher habitats in the cumulative effects analysis area. These reductions would be additive to the losses associated with past timber harvesting in the cumulative-effects analysis area as well as any ongoing harvesting. Activities would avoid riparian areas commonly used by fisher and minor changes to landscape connectivity would be anticipated, but the heavier retention corridor through the Mill Creek drainage towards Burr Saddle would partially mitigate some of the losses in connectivity and facilitate some potential movements within the cumulative effects analysis area. No changes in legal, motorized public access would occur. Overall, no appreciable changes in human disturbance and potential trapping mortality would be anticipated. Thus, a minor risk of adverse cumulative effects to fisher

would be anticipated since: 1) harvesting would modify some upland fisher habitats, but upland habitats would persist; 2) minor changes in landscape connectivity would be anticipated and connectivity in riparian areas would not be altered; 3) harvesting in a relatively small portion of the cumulative-effects analysis area would partially reduce snags and snag recruits, while increasing the coarse woody debris levels, largely in the smaller-sized pieces; and 4) no changes to legal, motorized public access would occur.

FLAMMULATED OWLS

Issue

Proposed activities may alter flammulated owl habitat by reducing canopy closure and increasing tree spacing, while potentially removing snags needed by flammulated owls for nesting.

Introduction

Flammulated owls are tiny, migratory, insectivorous forest owls that inhabit old, open stands of warm-dry ponderosa pine and cool-dry Douglas-fir forests in the western United States and are secondary cavity nesters. In Montana, flammulated owls appear to initiate nesting later than most of the other owl species; they generally initiate nesting in May, and nestlings usually fledge during August. In general, preferred habitats have open to moderate canopy closure (30-50 percent) with at least 2 canopy layers, and are often near small clearings. They usually nest in cavities excavated by pileated woodpeckers or northern flickers in 12-25" dbh ponderosa pine, Douglas-fir, or aspen. Without disturbance, Douglas-fir encroach upon ponderosa pine stands resulting in increased stand density and decreased habitat quality for flammulated owls. Periodic, low-intensity underburns can increase habitat suitability and sustainability by reducing the density of understory seedlings and saplings, stimulating shrub growth, and by protecting large dominant trees from ladder fuels and competition with other mature trees.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 5,172-acre project area. Cumulative effects were analyzed on the 16,992-acre cumulative effects analysis area described above in the Analysis Areas portion. This area includes enough area to support several pairs of flammulated owls (McCallum 1994).

Existing Environment

There are approximately 2,651 acres (52% of the project area) of potential flammulated owl habitats in dry ponderosa pine, Douglas-fir, and Douglas-fir/western larch stands across the project area. There are an additional 829 acres of potential flammulated owl habitats on dry ponderosa pine, Douglas-fir, and Douglas-fir/western larch stands on DNRC-managed lands within the cumulative effects analysis area. Some suitable habitats likely exist on a portion of the 5,647 acres (77% of non-DNRC-managed lands) of open and closed forested habitats on other ownerships in the cumulative effects analysis area; however, like the project area, portions of these forested areas are not likely preferred flammulated owl habitat types. Elsewhere in the cumulative effects analysis area, some of the forested habitats have been harvested in the recent past, potentially improving flammulated owl habitat by creating foraging areas and reversing a portion of the Douglas-fir encroachment and opening up stands of ponderosa pine; however retention of large ponderosa pine and/or Douglas-fir was not necessarily a consideration in some of these harvest units, thereby minimizing the benefits to flammulated owls. Modern fire suppression has allowed Douglas-fir in-growth to create denser stands of ponderosa pine and Douglas-fir in portions of the cumulative effects analysis area, which has

reduced habitat quality for flammulated owls. Any ongoing timber management in the cumulative effects analysis area could continue to alter potential flammulated owl habitats.

Environmental Effects-Flammulated Owl

No Action Alternative: Direct and Indirect Effects

Existing flammulated owl habitats in the project area would persist. Thus, a negligible risk of adverse direct and indirect effects to flammulated owls would be anticipated since: 1) no disturbance to flammulated owls would be anticipated; and 2) no changes to potential nesting habitats would be anticipated.

No Action Alternative: Cumulative Effects

Existing flammulated owl habitats would persist. Thus, a negligible risk of adverse cumulative effects to flammulated owls would be anticipated since: 1) no disturbance to flammulated owls would be anticipated; and 2) no changes to potential nesting habitats would be anticipated.

Action Alternative: Direct and Indirect Effects

Flammulated owls can be tolerant of human disturbance (McCallum 1994), however the elevated disturbance levels associated with proposed activities could negatively affect flammulated owls should activities occur when flammulated owls are present. Proposed activities could overlap the nestling and fledgling periods. Since some snags and large trees would be retained, loss of nest trees would be expected to be minimal. Proposed activities on 1,623 acres of potential flammulated owl habitats (61% of the habitats in the project area) would open the canopy while favoring western larch, ponderosa pine, and Douglas-fir. The proposed treatments would reduce canopy closure, which would allow more sunlight to reach the forest floor, which could stimulate grass and shrub growth, providing habitat for moths and other flying insects that provide food for flammulated owls. Elements of the forest structure important for nesting flammulated owls, including snags, coarse woody debris, numerous leave trees, and snag recruits would be retained in the proposed units. The more open stand conditions, the retention of fire adapted tree species, and the maintenance of limited existing snags would move the project area toward historical conditions, which is preferred flammulated owl habitat. The proposed pre-commercial thinning of ponderosa pine and Douglas-fir types could improve flammulated owl foraging habitats, while contributing to an increased representation of ponderosa pine in the future in those stands, which would improve potential flammulated owl habitat quality. Thus, a minor risk of adverse direct and indirect effects would be expected to flammulated owls since: 1) the potential exists to disturb flammulated owls; 2) proposed thinning could lessen the duration before these affected stands are again suitable for flammulated owl use; and 3) harvesting would open denser stands up while retaining elements of forest structure used for foraging and nesting by flammulated owl, improving overall flammulated owl habitat conditions in the project area.

Action Alternative: Cumulative Effects

Disturbance in flammulated owl habitats would be possible on a small portion of the cumulative effects analysis area and could be additive to ongoing activities in the cumulative effects analysis area. Proposed harvesting would increase the amount of the cumulative effects analysis area that has been recently harvested, which would add to the amount of foraging habitats available, but possibly at the expense of losing snags and large trees important for nesting. Overall no change in the amount of potential flammulated owl habitats would occur on DNRC-managed lands or any other ownerships; a slight improvement in habitat quality at the cumulative-effects analysis level could be realized with this alternative and the more historic conditions likely after proposed activities. Thus, a negligible risk of adverse cumulative effects to flammulated owls would be

expected since: 1) harvesting could disturb flammulated owls in a small portion of the cumulative effects analysis area should activities occur during the period when flammulated owls are in the vicinity; and 2) harvesting would improve the quality and sustainability of flammulated owl habitat on a portion of the cumulative effects analysis area by making this area more representative of historic conditions.

GRAY WOLF

Issue

Proposed activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.

Introduction

Wolves are a wide-ranging, mobile species that occupy a wide variety of habitats that possess adequate prey and minimal human disturbance, especially at den and/or rendezvous sites. Wolves are opportunistic carnivores that frequently take vulnerable prey (including young individuals, older individuals, and individuals in poor condition). In general, wolf densities are positively correlated to prey densities (Fuller et al. 1992, Oakleaf et al. 2006). In Montana, wolves prey primarily on white-tailed deer and elk (Kunkel et al. 1999, Arjo et al. 2002). Thus, reductions in big game populations and/or winter range productivity could indirectly be detrimental to wolf populations.

Wolves typically den during late April in areas with gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game wintering areas. When the pups are 8 to 10 weeks old, wolves leave the den site and start leaving their pups at rendezvous sites while hunting. These sites are used throughout the summer and into the fall. Disturbance at den or rendezvous sites could result in avoidance of these areas by the adults or force the adults to move the pups to a less adequate site. In both situations, the risk of pup mortality increases.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 5,172-acre project area. Cumulative effects were analyzed on the 31,308-acre area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support at least 1 pack of wolves.

Existing Environment

The project area has been partially in the Keystone wolf pack annual home range in the past. Additionally, a couple of wolf packs have been in the vicinity, including the Superior and Mineral Mountain wolf packs. Several landscape features commonly associated with denning and rendezvous sites occur in the project area, such as areas with gentle terrain near a water source (valley bottoms), areas that are close to big game winter ranges, and areas that are close to meadows or other openings. No known den or rendezvous sites occur in the project area, but some use of the project area by wolves could occur for breeding, hunting, or other life requirements. Big game species exist in the project area much of the non-winter period. Winter range for white-tailed deer (2,983 acres), mule deer (886 acres), and elk (5,172 acres) exists in the project area. Approximately 4,694 acres of the project area (91%) appear to be providing snow intercept and thermal cover attributes for big game.

Within the cumulative-effects analysis area, big game species are fairly common and winter range for deer and elk are fairly widespread in the lower elevation areas. Roughly 24,073 acres of winter range (77%) exist in the cumulative effects analysis area; approximately 22,427 acres of forested habitats in the cumulative effects analysis area appears to have sufficient canopy closure to provide thermal cover and snow intercept for big game. Numerous landscape features commonly associated with denning and rendezvous sites, including meadows and other openings near water, close to big game winter range, and in gentle terrain, occur in the cumulative-effects analysis area. Past timber management (including DNRC's Fourmile Timber Sale Project) and human developments have altered big game and wolf habitats in the cumulative effects analysis area. Any ongoing timber management in the cumulative effects analysis area could continue to alter potential gray wolf and big game habitats.

Environmental Effects-Gray Wolf

No Action Alternative: Direct and Indirect Effects

Negligible direct and indirect effects would be expected to gray wolves since: 1) no changes in human disturbance levels would occur; and 2) no appreciable changes to prey availability would occur.

No Action Alternative: Cumulative Effects

White-tailed deer, mule deer, and elk winter ranges would not be further affected and substantive changes in big game populations, distribution, or habitat use would be not anticipated. Levels of human disturbance would be expected to remain similar to present levels. Past harvesting and any ongoing harvesting may cause shifts in big game use and, subsequently, gray wolf use, of the cumulative-effects analysis area; however, no further changes would be anticipated that would alter levels of gray wolf use of the cumulative-effects analysis area. Thus, no further cumulative effects to gray wolves would be expected since: 1) no changes in human disturbance levels would occur, particularly near known wolf den and/or rendezvous sites; and 2) no changes to prey availability would occur.

Action Alternative: Direct and Indirect Effects

Wolves using the area could be disturbed by harvesting activities and are most sensitive at den and rendezvous sites, which are not known to occur in the project area or within 1 mile of the project area. If a den or rendezvous site were identified within 1 mile of the project area, a DNRC biologist would be consulted to determine if additional mitigations would be necessary. No changes in legal, motorized public access would occur, but minor increases in nonmotorized human access would occur with the construction of roughly 13 miles of restricted roads. After proposed activities, human disturbance levels would likely revert to pre-harvest levels. Wolf use of the project area for denning and rendezvous sites would likely revert to pre-harvest levels following proposed activities. In the short-term, the proposed harvesting could lead to slight shifts in big game use, which could lead to a shift in wolf use of the project area. Proposed harvesting activities on approximately 3,299 acres (64% of the project area) would alter canopy closure, summer big game habitat, and big game winter range habitat; proposed pre-commercial thinning on up to 1,000 acres (19% of the project area) would alter canopy closure and summer habitat. The modifications to summer range could alter some big game use of the project area, and subsequently could alter the use of the project area by wolves. Proposed activities would occur on roughly 2,014 acres (68%) of white-tailed deer winter range, 295 acres (33%) of mule deer winter range, and 3,299 acres (64%) of elk winter range; proposed activities would reduce canopy closure and potential winter use by big game on roughly 2,971 acres (63%) that likely have attributes facilitating considerable winter use by big game. Collectively, reductions in big game winter range habitats could

redistribute big game, but would not be expected to appreciably alter wolf prey abundance. Thus, a low risk of direct and indirect effects would be expected to gray wolves since: 1) minor increases in human disturbance levels would occur, with no increases near known wolf den and/or rendezvous sites anticipated; and 2) changes to big game summer habitats and winter range could alter big game use of the project area, but would not appreciably alter prey availability.

Action Alternative: Cumulative Effects

Disturbance to gray wolves in a portion of the cumulative effects analysis area would be possible, but would only occur for the short-period of time that activities would be occurring. No changes in legal, motorized human access would be anticipated and minor increases in non-motorized access would occur. Reductions in big game winter range would occur in a small portion of the cumulative effects analysis area; winter big game survival would not be expected to change appreciably. Reductions in cover in a small portion of the cumulative effects analysis area may cause slight changes in use by deer and elk; however, no appreciable changes in use within the cumulative-effects analysis area would be expected. These reductions in cover would be additive to losses from past timber-harvesting activities as well as any ongoing harvesting in the cumulative-effects analysis area. No substantive change in wolf use of the cumulative-effects analysis area would be expected; wolves could continue to use the area in the long-term. Thus, a low risk of cumulative effects to gray wolves would be expected since: 1) elevated human disturbance levels would be short-lived and negligible changes to long-term disturbance levels would be anticipated with no increases near known wolf den and/or rendezvous sites; and 2) modifications to big game summer range and winter range could alter big game distributions, but no appreciable changes to wolf prey availability would be anticipated.

PILEATED WOODPECKERS

Issue

Proposed activities could reduce suitable nesting and foraging habitat for pileated woodpeckers, which could alter pileated woodpecker use of the area.

Introduction

The pileated woodpecker is one of the largest woodpeckers in North America and excavates the largest cavities of any woodpecker. Preferred nest trees are large diameter western larch, ponderosa pine, cottonwood, and quaking aspen trees and snags, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat carpenter ants, which inhabit large downed logs, stumps, and snags. Aney and McClelland (1985) described pileated nesting habitat as "...stands of 50 to 100 contiguous acres, generally below 5,000 feet in elevation with basal areas of 100 to 125 square feet per acre and a relatively closed canopy." The feeding and nesting habitat requirements, including large snags or decayed trees for nesting and downed wood for feeding, closely tie these woodpeckers to mature forests with late-successional characteristics. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood in stands (McClelland 1979).

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area (5,172 acres). Cumulative effects were analyzed on the 16,992-acre cumulative effects analysis area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support several pairs of pileated woodpeckers (Bull and Jackson 1995).

Existing Environment

In the project area, potential pileated woodpecker nesting habitat exists on approximately 3,346 acres (65% of the project area). These habitats are dominated by ponderosa pine, Douglas-fir, and Douglas-fir/western larch stands. Additionally, 1,697 acres (33% of the project area) of sawtimber stands, dominated by ponderosa pine, Douglas-fir, and Douglas-fir/western larch exist in the project area, which may be potentially suitable foraging habitats. In the cumulative effects analysis area, roughly 4,028 acres (60%) of pileated woodpecker habitats exist on DNRC-managed lands dominated by ponderosa pine, Douglas-fir, and Douglas-fir/western larch. An additional 2,476 acres (37%) of potential feeding habitats exist on DNRC managed lands within the cumulative effects analysis area. Some suitable habitats likely exist on a portion of the 2,978 acres of forested habitats on other ownerships in the cumulative effects analysis area (41% of non-DNRC lands). Much of the 4,352 acres (59%) of shrubs, herbaceous areas, poorly stocked forested stands, and recently harvested stands on other ownerships in the cumulative effects analysis area is likely too open to be useful to pileated woodpeckers. Across the cumulative effects analysis area, ongoing tree mortality is reducing forested cover while increasing the amount of dead wood resources available for pileated woodpeckers. Any ongoing timber management in the cumulative effects analysis area could continue to alter potential pileated woodpecker habitats.

Environmental Effects-Pileated Woodpecker

No Action Alternative: Direct and Indirect Effects

A negligible risk of adverse direct and indirect effects to pileated woodpeckers would be expected since: 1) no harvesting would occur; 2) no further changes in the amount of continuously forested habitats would be anticipated; 3) no appreciable changes to existing pileated woodpecker habitats would be anticipated; and 4) long-term, succession-related declines in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would be anticipated.

No Action Alternative: Cumulative Effects

No disturbance of pileated woodpeckers would occur. Continued use of the cumulative-effects analysis area by pileated woodpeckers would be expected at similar levels as presently occurring. Thus, a negligible risk of adverse cumulative effects to pileated woodpeckers would be expected since: 1) no further changes to existing habitats would occur; 2) no further changes to the amount of continuously forested habitats available for pileated woodpeckers would be anticipated; and 3) long-term, succession-related changes in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would occur.

Action Alternative: Direct and Indirect Effects

Pileated woodpeckers can be tolerant of human activities (Bull and Jackson 1995) but might be temporarily displaced by any proposed activities that could occur during the nesting period. Harvesting would reduce forested habitats for pileated woodpeckers in the project area. Roughly 2,407 acres (72%) of the potential nesting habitat along with 876 acres (52%) of potential foraging habitats would be harvested. Some of the stands could be dense enough to receive some use by foraging pileated woodpeckers following proposed treatments, but most of these stands would be temporarily unsuitable for pileated woodpeckers due to the openness of the stands following proposed treatments. Quality of these potential pileated woodpecker habitats would be reduced for 20-40 years, depending on the density of trees retained. Elements of the forest structure important for nesting pileated woodpeckers, including snags, coarse woody debris, numerous leave trees, and snag recruits would be retained in the proposed harvest areas. Since pileated woodpecker density is positively correlated with the amount of dead and/or dying wood in a stand (McClelland 1979), pileated woodpecker

densities in the project area would be expected to be reduced on 3,299 acres. The silvicultural prescriptions would retain healthy western larch, ponderosa pine, and Douglas-fir while promoting the growth and/or regeneration of many of these same species, which would benefit pileated woodpeckers in the future by providing nesting, roosting, and foraging habitats. The proposed pre-commercial thinning and any planting could improve potential pileated woodpecker habitat quality into the future. Thus, a moderate risk of adverse direct and indirect effects to pileated woodpeckers would be anticipated since: 1) harvesting would reduce the amount of continuous-forested habitats available; 2) potential nesting habitats and foraging habitats would be removed; 3) snags and snag recruits would be removed; however, mitigation measures to retain some snags and snag recruits would be included, and 4) proposed treatments would promote seral species in the project area.

Action Alternative: Cumulative Effects

Reductions in pileated woodpecker habitat quality and the amount of continuously forested habitats available for pileated woodpeckers would occur. On DNRC-managed lands in the cumulative effects analysis area, roughly 1,621 acres (40%) of pileated woodpecker nesting and 1,600 acres (65%) of foraging habitats would not be altered. Any ongoing harvesting in the cumulative effects analysis area could continue altering potential pileated woodpecker habitats in the vicinity. Snags, coarse woody debris, and potential nesting trees would be retained in the project area; however, future recruitment of these attributes may be reduced in a portion of the area by the proposed activities. Modifications to pileated woodpecker habitats under this alternative would be additive to habitat losses associated with past harvesting; continued use of the cumulative effects analysis area would be anticipated, but likely at a slightly reduced level. Continued maturation of stands across the cumulative-effects analysis area would provide future pileated woodpecker habitats. Thus, a minor risk of adverse cumulative effects to pileated woodpeckers would be anticipated since: 1) harvesting would further alter the amount of continuous forested habitats available in the cumulative-effects analysis area; 2) potential nesting and foraging habitats would be modified, but some habitats would persist in the cumulative-effects analysis area; 3) snags and snag recruits would be removed; however, mitigation measures would retain some of these attributes; and 4) proposed treatments would promote seral species in a portion of the cumulative effects analysis area.

BIG GAME

BIG GAME WINTER RANGE

Issue

Proposed activities could remove forest cover on big game winter range, which could reduce the carrying capacity of the winter range

Introduction

Winter ranges enable big game survival by minimizing the effects of severe winter weather conditions. Winter ranges tend to be relatively small areas that support large numbers of big game, which are widely distributed during the remainder of the year. These winter ranges have adequate midstory and overstory to reduce wind velocity and intercept snow. The effect is that temperatures are moderated and snow depths are lowered, which enables big game movement and access to forage with less energy expenditure than in areas with deeper snow and colder temperatures. Snow depths differentially affect big game; white-tailed deer are most

affected, followed by mule deer, elk, and then moose. Thus, removing cover that is important for wintering big game through forest management activities can increase their energy expenditures and stress in winter, but may increase forage production for use on summer range. Reductions in cover could ultimately result in a reduction in winter range carrying capacity and subsequent increases in winter mortality within local big game herds.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 5,172-acre project area. Cumulative effects were analyzed on the combined winter ranges in the 31,308-acre cumulative effects analysis area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support many elk.

Existing Environment

Montana Department of Fish, Wildlife, and Parks identified white-tailed deer (2,983 acres), mule deer (886 acres), and elk (5,172 acres) winter range in the project area. These winter ranges are part of larger winter ranges in the area. Mature ponderosa pine and Douglas-fir, with lesser amounts of mixed conifer stands, in the project area are providing attributes facilitating use by wintering big game. Approximately 4,694 acres of the project area (91%) appear to be providing snow intercept and thermal cover attributes for big game. Evidence of non-winter use by deer and elk was noted during field visits.

Roughly 24,073 acres of composite deer and elk winter range (77% of the cumulative effects analysis area) exist in the cumulative effects analysis area; roughly 22,427 acres (72%) of the cumulative effects analysis area appears to have sufficient canopy closure to provide thermal cover and snow intercept for big game. In the recent past, timber harvesting (including DNRC's Fourmile Timber Sale Project) within the cumulative effects analysis area has reduced thermal cover and snow intercept. Portions of the cumulative effects analysis area are in non-forested, herbaceous, or shrub types, which would not be expected to provide thermal cover or snow intercept in the future. Human disturbance within the winter range is associated with residential development, agricultural activities, commercial timber management, and several roads. Any ongoing timber management in the cumulative effects analysis area could continue to alter potential big game winter range habitats.

Environmental Effects-Big Game Winter Range

No Action Alternative: Direct and Indirect Effects

No direct or indirect effects to big game winter range would be anticipated since: 1) no further changes in the amount of mature-forested habitats in the winter range would be anticipated; 2) no further changes in thermal cover and snow intercept would be anticipated; and 3) human disturbance levels would not change.

No Action Alternative: Cumulative Effects

Continued winter use of the larger winter range would be expected. No further changes in thermal cover and snow intercept would be anticipated. Human disturbance levels would be anticipated to continue at current levels. No appreciable changes to big game distribution or habitat use would be anticipated. Thus, no cumulative effects to big game winter range would be expected since: 1) no further changes in the amount of mature-forested habitats in the winter range would be anticipated; 2) no further changes in thermal cover and snow intercept would occur; and 3) human disturbance levels would not change.

Action Alternative: Direct and Indirect Effects

Proposed activities could occur in the winter, and disturbance created by mechanized logging equipment and trucks could temporarily displace big game animals during periods of operation for 3 to 5 years. However, winter logging provides felled tree tops, limbs, and slash piles that could concentrate feeding deer during nighttime and quiet periods when logging operations are shut down. Increasing short-term forage availability in this manner may partially offset some of the effects associated with temporary displacement caused by logging disturbance. There would be short-term added risk of disturbance and displacement of wintering animals that could result in moderate adverse effects associated with logging operations, short term road construction, and road use in the project area. However, no long-term effect to winter range carrying capacity or factors that would create long-term displacement or reduced numbers of big game would be anticipated.

Proposed activities would occur on roughly 2,014 acres (68%) of white-tailed deer winter range, 295 acres (33%) of mule deer winter range, and 3,299 acres (64%) of elk winter range; proposed activities would reduce canopy closure and potential winter use by big game on roughly 2,971 acres (63%) that likely have attributes facilitating considerable winter use by big game. Following proposed activities, canopy densities in these stands providing snow intercept and thermal cover would be reduced, reducing habitat quality for wintering big game. In general, it could take 30 to 50 years for these stands to regenerate and attain a size capable of providing thermal cover for big game. Proposed activities would not prevent big game movement through the project area appreciably in winter and could stimulate browse production in the units. Proposed pre-commercial thinning and any planting would not appreciably alter winter range attributes, but could shorten the time before some of these stands provide these attributes to big game in the future. Thus, a moderate risk of adverse direct or indirect effects to big game winter range would be anticipated since: 1) the relatively short-term that logging activities could create disturbance in this area; 2) harvesting would alter a relatively small amount of the stands that are providing thermal cover and snow intercept habitats for big game species; and 3) portions of winter ranges for several species of big game would be altered.

Action Alternative: Cumulative Effects

Disturbance and displacement associated with this alternative could be additive to any displacement associated with ongoing activities in the cumulative effects analysis area and any other disturbances that may be affecting wintering big game. Similarly, any harvesting that may be occurring in the cumulative effects analysis area could continue altering big game winter range and/or disturbing big game. Proposed activities would reduce canopy closure on 3,299 acres of winter range (64%) and roughly 2,971 acres (63%) of forested stands that appear to have attributes facilitating considerable use by wintering big game. Modifications to thermal cover and snow intercept in the project area could further alter the amount of the larger winter range providing these attributes for big game. Continued use of the larger winter range would be expected. Thus, a minor risk of adverse cumulative effects to big game would be anticipated since: 1) the relatively short-term that logging activities would create disturbance in a small portion of the cumulative effects analysis area; 2) a small percentage of the larger winter range would be altered; 3) availability of lower-quality cover in the vicinity that provides some opportunity for big game should they be displaced.

BIG GAME SECURITY HABITAT**Issue**

Proposed activities could remove big game security cover, which could affect hunter opportunity and local quality of recreational hunting.

Introduction

Timber harvesting can increase vulnerability of big game animals by changing the size, structure, juxtaposition, and accessibility of areas that provide security during hunting season (Hillis et al. 1991). As visibility and accessibility increase within forested landscapes, moose, elk and deer have a greater probability of being observed and, subsequently, harvested by hunters, or they may become displaced or reduced in numbers due to lowered effective carrying capacity of the local habitat. Reduced cover attributable to logging and roads can also influence the effective use of habitat for big game species. Big game security habitat are nonlinear blocks of hiding cover that are more than 0.5 mile from open roads and are a minimum of 250 acres in size. For the purpose of this analysis, cover was considered generically as big game cover for deer, elk, and moose. Because elk are highly social, wide-ranging species, providing for their cover needs helps ensure that habitat needs for other ungulates, such as deer and moose are met as well. Because of their smaller size and behavioral differences, mule deer and white-tailed deer are able to use smaller cover patches more effectively for escape and security. Moose are a solitary, wide-ranging species capable of effectively using relatively small cover patches, and the hunting season for moose is heavily regulated, greatly reducing risk of overharvest by humans. Therefore, for this analysis it is assumed that if available security cover would provide for the needs of elk, it would also generally be adequate to meet the needs of moose, mule deer, and white-tailed deer.

Analysis Area

Direct and indirect effects were considered at the scale of the project area (5,172 acres). Cumulative effects were analyzed on the 31,308-acre area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support hundreds of elk.

Existing Environment

Hiding cover is abundant in the project area. There are limited (4.4 miles) open roads in the project area. Considerable non-motorized access to the project area exists given the presence of the open roads, the level of access to higher terrain, and the 22.3 miles of restricted roads in the project area. A portion of the project area does not contain big game security habitats due to the proximity to open roads, however roughly 2,319 acres (45% of project area) are distant enough and contain sufficient cover to be able to contribute to larger blocks of potential security habitat that extend beyond the project area.

Hiding cover varies within the cumulative effects analysis area with the recent modifications from timber management (including DNRC's Fourmile Timber Sale Project) and other human activities, but the combination of topography, distance from open roads, and the presence of vegetation likely provides adequate cover for elk during the hunting season in the cumulative effects analysis area. In the cumulative effects analysis area, access for recreational hunting is relatively high, with several open roads (at least 76 miles, 1.6 miles/sq. mile) that facilitate access and numerous restricted roads (at least 69 miles; 1.4 miles/sq. mile) that could be used for non-motorized use. Within the cumulative effects analysis area, 3 patches (total of 10,712 acres; 34%) of potential security habitat exist. All 3 patches look to extend beyond the cumulative effects analysis area and contributes to larger blocks of potential security habitats. Any ongoing timber management in the cumulative effects analysis area could continue to alter potential big game security habitats.

Environmental Effects-Big Game Security Habitat

No Action Alternative: Direct and Indirect Effects

No forest management activities would occur in the project area. No risk of adverse direct or indirect effects to security habitat for moose, elk, mule deer, and white-tailed deer would be expected since: 1) no changes in

existing security habitat would be anticipated and continued maturation of forest cover would improve big game security habitat; 2) the level of public access to the project area would not change; and 3) no appreciable changes to big game survival would be anticipated.

No Action Alternative: Cumulative Effects

No further changes in big game security habitat would be anticipated. Past harvesting has altered big game security habitat and allowed increased human access and any ongoing alterations in the cumulative effects analysis area could continue to alter big game security habitats. Continued maturation in previously harvested stands in the cumulative-effects analysis area would improve hiding cover in those areas. No other changes in disturbance to big game and potential mortality due to hunting would be anticipated. Thus, no adverse cumulative effects to big game security habitat would be anticipated since: 1) no further reductions in big game security habitat would occur and moderate levels of security habitat and hiding cover would persist within the cumulative-effects analysis area; 2) no changes in open roads, motorized access, or public access would occur; and 3) no appreciable changes to big game survival would be anticipated.

Action Alternative: Direct and Indirect Effects

Tree density within proposed units would be reduced on approximately 3,299 acres, including roughly 1,713 acres (62% of existing security cover) of forested stands in the project area contributing to big game security habitat. Hiding cover would be reduced within the proposed units, but would improve as trees and shrubs become reestablished in the openings over the next 10-20 years. The retention of structure within proposed units and unharvested areas between the various units, including riparian habitats and other connectivity corridors would reduce the potential effects of the hiding cover reductions. Some increases in sight distance would be anticipated. Proposed thinning would also increase sight distances while altering hiding cover. Overall, changes to sight distance and hiding cover would have minor effects to big game vulnerability risk in the project area. No changes in open roads or motorized access for the general public would occur. During all phases of the project, any roads opened with project activities would be restricted to the public and closed after the completion of project activities. No changes in open road densities would occur and minor increases in closed roads would occur with the proposed construction of roughly 13 miles of restricted roads. Numerous contract stipulations would minimize the effect on the existing big game security habitat by prohibiting contractors from carrying firearms while conducting contract operations and prohibiting contractors from accessing restricted areas for other purposes, such as hunting. Collectively, a minor risk of adverse direct and indirect effects to big game security habitat would be anticipated since: 1) reductions to existing hiding cover would reduce the quality of the big game security habitat in the project area; 2) no changes in open roads or motorized access, and minor increases in non-motorized access for the general public would be anticipated that could alter hunter access; and 3) negligible changes in big game survival would be anticipated.

Action Alternative: Cumulative Effects

Alterations of cover could reduce the quality of big game security habitat in a small portion of the cumulative effects analysis area and would be additive to past reductions in the cumulative effects analysis area. Ongoing activities in the cumulative effects analysis area would continue altering hiding cover, but would not be expected to appreciably alter security habitats. Continued maturation across the cumulative-effects analysis area would improve hiding cover and big game security habitat. No changes in public, motorized access would be expected and minor increases in non-motorized access could occur, which would not appreciably affect big game vulnerability in the cumulative effects analysis area. Negligible effects to big game survival would be anticipated. Thus, a minor risk of adverse cumulative effects to big game security habitat would be anticipated.

since: 1) quality of hiding cover in a small portion of the cumulative effects analysis area would be reduced, which would reduce the quality of the big game security habitat, but security habitat and hiding cover would persist in the cumulative-effects analysis area; 2) no changes in open roads or motorized access would occur and minor increases in non-motorized access for the general public would be expected that might alter hunter access; and 3) negligible changes in big game survival would be anticipated.

Wildlife Mitigations

- A DNRC biologist will be consulted if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.435) are needed.
- Motorized public access will be restricted at all times on restricted roads that are opened for harvesting activities; signs will be used during active periods and a physical closure (gate, barriers, equipment, etc.) will be used during inactive periods (nights, weekends, etc.). These roads and skid trails would be reclosed to reduce the potential for unauthorized motor vehicle use.
- Snags, snag recruits, and coarse woody debris will be managed according to *ARM 36.11.411* through *36.11.414*, particularly favoring western larch and ponderosa pine. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.
- Contractors and purchasers conducting contract operations will be prohibited from carrying firearms while on duty.
- Food, garbage, and other attractants will be stored in a bear-resistant manner.
- Retention of patches of advanced regeneration of shade-tolerant trees, such as sub-alpine-fir and spruce, in units containing lynx habitats would break-up sight distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx.
- In pre-commercial thinning units, retain small shade tolerant trees (such as sub-alpine fir and spruce) to provide potential habitat structure for snowshoe hares by increasing the levels of horizontal cover and accelerating the development of multi-storied stands.
- Provide connectivity for fisher, Canada lynx, and a host of other species by maintaining corridors of unharvested and/or lighter harvested areas along riparian areas, ridge tops, and saddles. Design a heavier retention corridor through the Mill Creek drainage that is at least 300 feet wide with 40% or more canopy closure following treatments that could facilitate movements and provide some landscape connectivity.

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